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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 119, NO. 3 JULY 15, 1946

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TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

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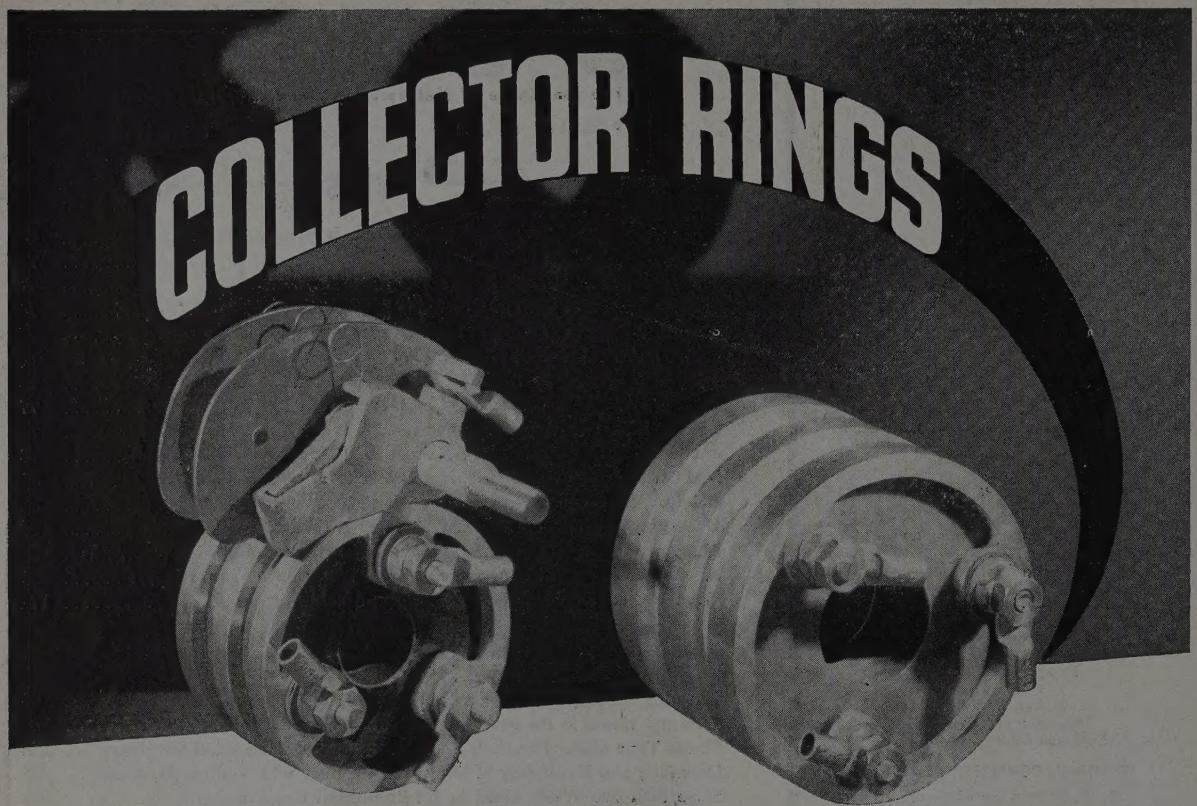
Testing Bolts for Strength and Ductility

Drawing, Stretching and Stamping of Aluminum

Behavior of Various Types of Open-Hearth Bottoms

Lighter Freight Cars Increase Payload for Railroads



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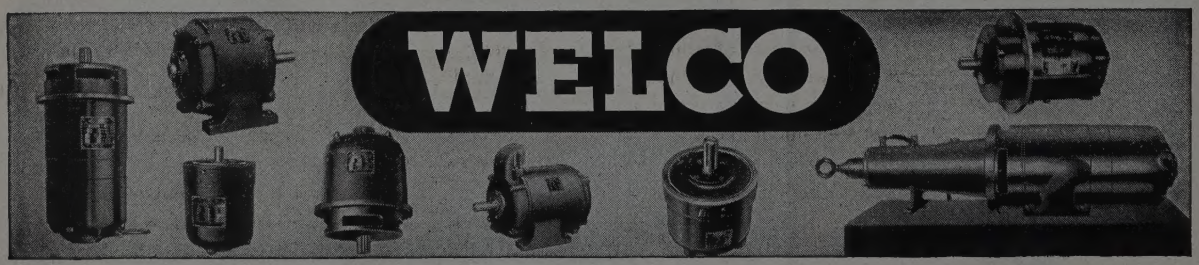


As the EDITOR VIEWS the NEWS

Serving the World

Persons who have had unusual opportunities to observe postwar conditions throughout many countries of Asia, Africa and Europe are bound to be impressed by the extent to which these parts of the world now are dependent upon the American made motor vehicle for transportation and other services.

By virtue of the exigencies of war and of the redistribution of facilities which came about through moving military forces into areas occupied by the enemy, American passenger cars, jeeps, trucks, bulldozers, etc. now are found in great numbers in countries where heretofore they had been seldom seen. It is likely that at the present moment these products of American mass production are serving in more countries and are being driven by persons of greater diversity of tongue and nationality than at any previous time in peace or in war.

The fact that American motor vehicles now are so commonly used in the area extending from the Pacific islands west to the Atlantic seaboard of Europe may be significant. There is no question but that the American car is held in high esteem wherever it is known. That Japanese, Chinese, Russians, Hindus, Arabs and Europeans of many nationalities now are familiar with it and recognize its advantages may have some bearing upon the development of world markets for automobiles in the next decade.

The United States has been leading the world in the production and use of motor cars for several decades. Some excellent cars have been manufactured in England, France, Germany, Italy, Russia and Japan, but never in great volume in peacetime. In 1941, the last year for which dependable figures are available, there were slightly more than 45 million automobiles registered in the entire world. Of these, 32.5 million or 72 per cent, were in the United States and about 12,800,000 or 28 per cent, were in all other countries.

It seems likely this lead of American manufacturers in the automobile field will be maintained and even increased during the early stages of the postwar period. Germany, Italy and Japan will resume on a limited basis. England, of course, will be eager to speed production as rapidly as possible. Russia, whose potential as a large scale producer in peacetime has not been tested, may in time become a formidable factor in the automotive field.

Meanwhile, the American product is serving the world well and winning prestige and popularity that may prove to be priceless in the competition that lies ahead.

FREE MARKETS: Regardless of the ultimate fate of price control legislation, experience since the demise of OPA has proved far from alarming. There have been few signs of runaway inflation, and these have appeared largely in foodstuffs and rents.

Opinion poll on price control of a broad cross-section of the metalworking industry, just completed by STEEL, confirms the oft-expressed view of industry spokesmen restoration of a free economy would not be followed by a period of wild inflation. Large majority of the manufacturers participating in the survey, while favoring free markets in which to operate, indicate their intention to hold the line on prices. Only one-third of them favor reinstituting some form of price regulation.

That most metalworking firms are confident the law of supply and demand will operate to keep prices in check is indicated by the fact most of them feel supply will come in balance with demand in the relatively short period of a year. Fully one-third think such balance will be attained within six months, and another third within a year. The extreme time limit for achievement of such balance is given as two years.

Uncertainty with regard to price control legislation undoubtedly is a restraining influence on prices

(OVER)

in some sections of the economy. But this seems to have little weight on thinking in the metalworking field. STEEL's poll appears to support the premise manufacturers are too realistic to increase their prices hastily and thoughtlessly. Adjustments necessitated by costs can be expected, but there is absolutely no evidence to indicate producers of durable goods will be so shortsighted as to take advantage of a temporary situation and charge as much for their products as the traffic will bear. Competition for orders, they know, will not be long in catching up with them. —p. 69

* * *

PROSPECTS BRIGHTEN: Production appears to be rising at a very promising rate all along the line now that major labor disputes have been settled. With steel operations close to the pre-coal strike rate, just under 90 per cent of capacity, production in many hard goods manufacturing lines is mounting. In electrical manufacturing, for instance, output of some appliances is reported above pre-war levels.

All of these reports are especially encouraging considering the extremely difficult handicaps which have confronted manufacturers all year to date. They certainly warrant a high degree of optimism for the last half of the year, providing the basis for hope that substantial headway will be made toward catching up with the huge pentup demands of the civilian economy before the snow flies.

Whatever success attends industry's efforts over the remainder of the year, however, will be dependent upon the speed with which raw material and component supply pipelines can be filled. That substantial progress in this respect is being made is indicated by the fact that the production of castings, vital in countless articles of manufacture, is steadily rising despite unusually difficult supply problems. —p. 74

* * *

WROUGHT STEEL WHEELS: Importance of doing something about the depleted supply of railroad rolling stock was emphasized again last week when the long-awaited bumper wheat crop lay unmoved in the Midwest.

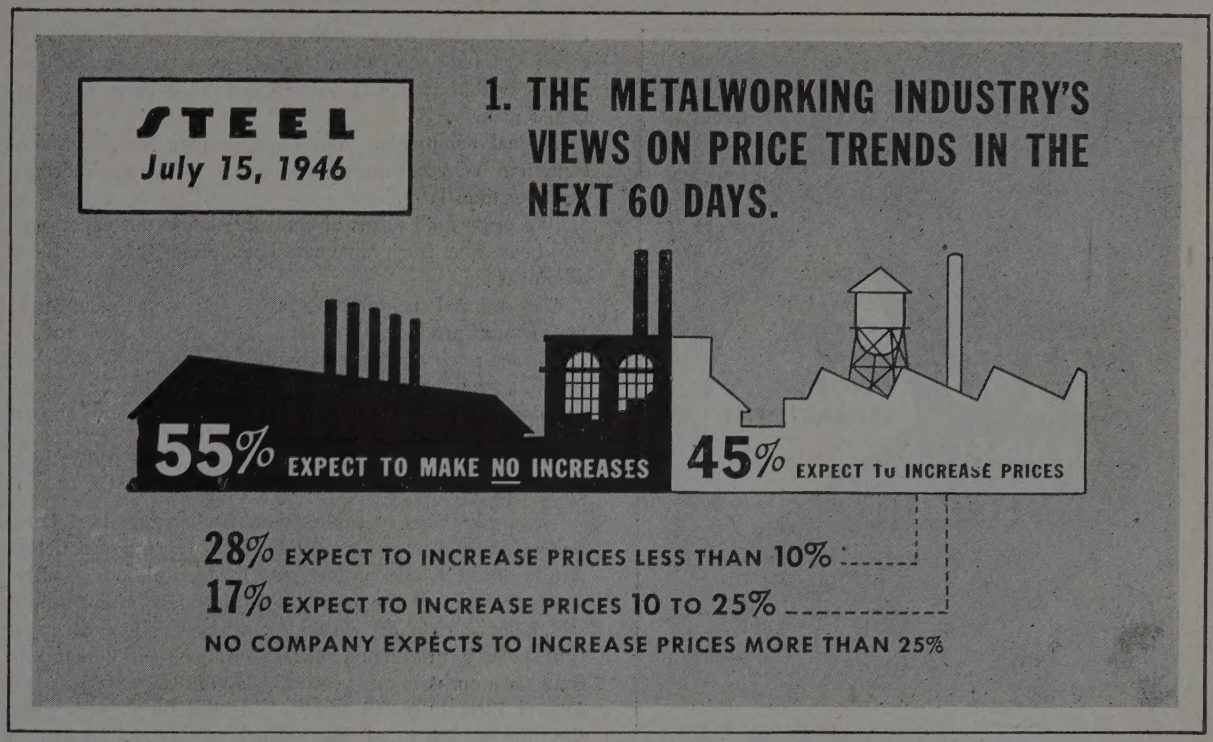
Helping to reduce the car shortage, and consequently to still the world-wide clamor for wheat, is the production of wrought steel wheels beginning with the slicing of tapered corrugated ingots and ending with the final drawing operation.

The result of an aggressive research program, modern wrought wheel manufacture employs specially-designed equipment, up-to-date heat treating procedures, and strict quality controls. In the "torture chamber" for instance, research men produce thermal cracks and shelling that would result only after years of actual service. —p. 106

SIGNS OF THE TIMES: Under impetus of the Veterans Emergency Housing Program, home building during the first five months of this year (p. 72) came close to the all-time record established in 1925. With strikes in steel, coal and lumber industries out of the way government housing authorities expect a further sharp rise in building over the remainder of the year, provided prices do not get out of hand. . . . Steel producing firms continue to round out facilities for the civilian market, latest to announce important expansion and improvement program being National Tube Co. which plans (p. 73) important installations at its Lorain, O., and Gary, Ind., works. . . . Foundry industry is grappling with severe supply shortages (p. 74) but despite these handicaps is making encouraging progress in stepping up production with labor conditions greatly improved. . . . Promising gains in production of electrical appliances is reported currently (p. 77), output of some items being above prewar levels. . . . . Increasingly acute scarcity of scrap (p. 75) threatens early curtailment of steelmaking operations unless corrected. Some collectors are reported holding material in expectation of an early price increase. . . . Machinery electrification in its full sense means correct application of motors as well as associated control equipment and other auxiliary devices to provide the desired sequence of operations; it means (p. 98) complete co-operation between electrical manufacturer and machinery builder. . . . Pending determination of the fate of price control OPA's staff is standing by (p. 77) but plans to go right to work if, and when, it gets the green light. Metals Division will resume its study of steel prices immediately should OPA get a new lease on life. . . . Canadian dollar returned to parity with the U. S. dollar last week as result of the lapse of price control in the United States (p. 76). Importers of steel, as a result, are favored with a reduction in price of 10½ per cent from former levels. . . . A coal which cannot justify its use by the standard of ash and yield should be studied carefully (p. 122) to make certain it is an economic asset when considering its relationship to blast furnace fuel costs. . . . Unnamed brokers at Detroit are reported offering substantial tonnages of sheet and strip (p. 85) at prices considerably above going market. Mystery surrounds offers with buyers skeptical of opportunist brokers' ability to obtain steel in any appreciable quantity from the mills which are booked months ahead.

E. C. Shane

EDITOR-IN-CHIEF



Moderate Rise in Prices Seen with Output Balancing Demand in 1947

Nearly three fourths of metalworking companies oppose re-enactment of price controls, STEEL survey shows. Fifty-five per cent expect to make no increases within next 60 days. Advances planned by others less than 25 per cent. See production stimulated by elimation of OPA

NEARLY three hundred companies making products ranging from bolts and nuts to electric toasters, automobiles and locomotives and providing an excellent cross section of the metalworking industry plan to hold the line on prices of most products in the weeks immediately ahead, regardless of what Congress does about price controls.

In refutation of the loud cries about wild inflation emanating from certain Washington bureaucrats, no company reporting now is planning to raise prices more than 25 per cent. In fact, two-thirds of the companies reporting to STEEL expect that supply for their products will be fairly well in balance with demand within the next 12 months and that industry generally will be sailing on a pretty even keel by well before the end of 1947.

A large majority of the metalworking companies favor free markets now—without any industrial price controls. Less than a third favor enactment of new price control legislation.

Fifty-five per cent of the companies questioned say they expect to make no increase in prices during the next 60 days, but will maintain prices prevailing June 30.

Twenty-eight per cent of reporting companies believe some increase will be necessary but say this would be less than 10 per cent over June 30 prices.

Seventeen per cent indicate it will be necessary to raise prices from 10 to 25 per cent.

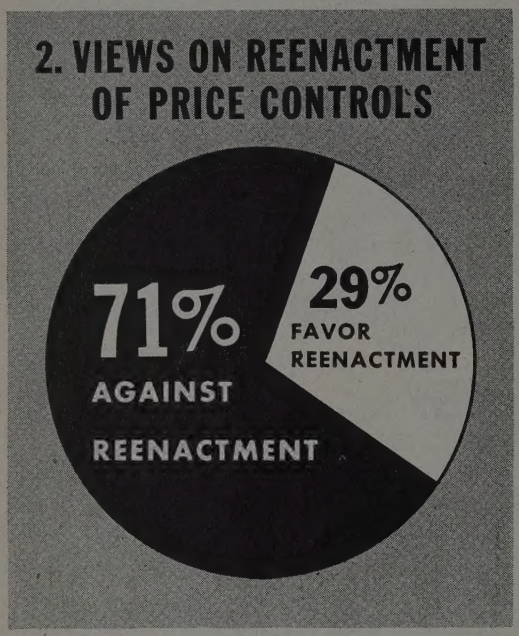
No company is planning increases exceeding 25 per cent.

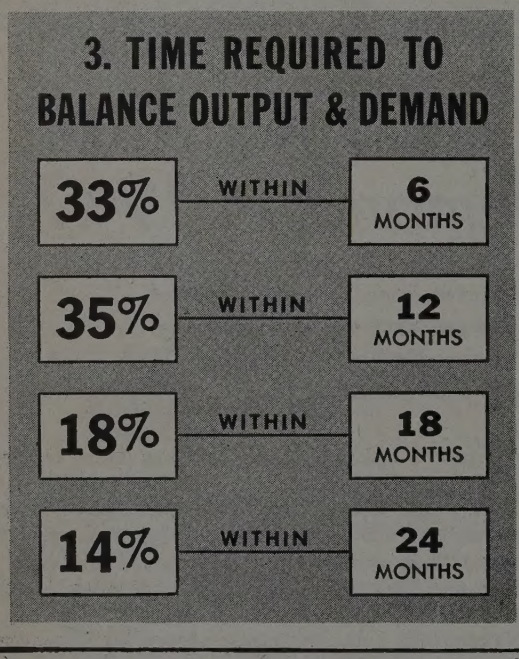
Elimination of Office of Price Administration controls generally is favored by the companies questioned, although some criticize the manner in which the law was allowed to expire as political bungling.

In reply to the question, "Do you favor re-enactment of industrial price controls in some form until supply and demand are in closer balance?" 71 per cent answer in the negative and 29 per cent favor some reinstitution of controls.

A considerable number favor re-enactment of rent and food price controls.

Generally, the companies reporting believe that production will be stimulated by the removal of OPA price





controls. In some cases, it is pointed out, production of components is being held up by too low price ceilings and this holds down production of the finished product. With the return of free markets higher prices can be paid suppliers of critical components and total production increased to a level where a general price increase may not be necessary.

Several smaller companies complain that their staffs were inadequate to handle all the red tape required by OPA and also to devote full energy to production.

Cognizance of the fact removal of controls will be accompanied by some rather abrupt readjustments is taken by many companies questioned. However, the consensus is that it would be better to face these readjustments now.

Typical comments: "We have to take the headaches sometime. Why not now. Less damage to the whole economy now than later."

"We oppose all forms of control because our experience has been that they have not been effectively nor fairly administered."

"Let normal competition again strike a balance in wages and product."

"Under price control as administered so far, we cannot get full production. Much better to get production up as soon as possible and hold prices down by natural means."

"We believe production will improve greatly without OPA restrictions."

Wide variations in expectations as to when companies believe their production will balance demand are noted. A few report a balance has been reached already. Thirty-three per cent of the companies questioned think output will balance demand within six months. Thirty-five per cent believe production will catch up with demand in from six months to one year; 18 per cent estimate between 12 and 18 months will be required; and 14 per cent place the time needed to achieve balance at between 18 and 24 months.

These predictions indicate that by July, 1947, two thirds of the metalworking industry will have caught up with accumulated demand and that the remainder will be rapidly approaching the balancing point.

Factors Affecting Supply-Demand Balance

Many qualifications are made by the reporting companies in estimating the time required to reach a balance. Most frequently mentioned unknowns are: 1—the attitude of labor toward increasing productivity; and 2—availability of raw materials.

Typical comments: "The answer is indefinite. If the men make up their minds to earn the wages paid, the time will be very short. If not, the present condition will continue indefinitely. Unless, of course, I get tired of paying for something which I do not get."

Output will balance demand "when labor goes to work and stays on the job so that we are assured of an orderly supply of raw materials."

"When the unions stop striking at our suppliers' plants and we can obtain materials. Then about six months will result in a balance."

"Whenever sheet steel and other supplies are obtainable in sufficient quantity."

"When we can get sufficient material."

"Depending on supply of electric motors."

"Entirely dependent upon whether OPA stays out of the picture. If they do stay out, I'd say within one year."

"Since the government and OPA has made it possible for everybody to go into everyone else's business, how can the supply and demand position be determined?"

Balancing of supply and demand will depend to some extent on now unknown factors, such at the disposition of government-owned surplus materials, the use to which war-built industrial capacity is put, and the extent to

How Plants of Various Sizes View Prospects For Prices and Production

QUESTIONS		Plants with less than 25 Employes	Plants with 25-50 Employes	Plants with 50-100 Employes	Plants with 100-250 Employes	Plants with 250-500 Employes	Plants with 500-1000 Employes	Plants with over 1000 Employes	Average for Plants of All Sizes
1. How much do you expect to increase prices on the average in the next 60 days as compared with June 30, 1946 levels? (No plant expects to increase prices more than 25%.)	Number expecting to make no increases	62%	78%	53%	57%	28%	50%	78%	55%
	Number expecting to raise prices less than 10%	24%	5%	20%	30%	48%	39%	11%	28%
	Number expecting to raise prices 10 to 25%	14%	17%	27%	13%	24%	11%	11%	17%
2. Do you favor reenactment of industrial price controls in some form until supply and demand are in closer balance?	Number against reenactment	68%	73%	77%	77%	55%	88%	45%	71%
	Number favoring reenactment	32%	27%	23%	23%	45%	12%	55%	29%
3. When do you think output of your products will be in balance with demand?	Within 6 months	40%	59%	50%	33%	10%	19%	18%	33%
	Within 12 months	35%	36%	32%	29%	54%	43%	18%	35%
	Within 18 months	10%	5%	7%	16%	18%	25%	46%	18%
	Within 24 months	15%	..	11%	22%	18%	13%	18%	14%

which consumers' financial reserves have been tapped due to loss of current income because of strikes, layoffs for lack of materials, etc.

Comments by various company executives regarding their pricing policies in a free market indicate they will keep prices as low as possible. Some report that manufacturing economies developed during the war will enable them to absorb a part of the increased costs of labor and materials and that little or no increase in prices will be necessary, unless costs continue to mount. Manufacturers generally indicate they do not want to price themselves out of a market and believe that competition soon will become an important factor in controlling prices.

Typical of the attitude is the comment of a machinery manufacturer: "We do not expect to increase prices unless we are forced to do so by greater costs to us. We would rather have years of good business than have one or two years of excessive boom business and then find that much of the buying is lost due to excessive prices."

Another company has set up a schedule of price increases which calls for no increase on 60 per cent of its output, for a 10 per cent increase on 20 per cent of its volume and for 20 per cent increase on the remaining 20 per cent of output. The items that are to be increased 20 per cent, the company points out, have not been produced since 1939, so that the increase is less than it appears to be. "We are not raising our prices to the old profit margin as we want to prove that private enterprise is able to control itself better than any government agency can."

A manufacturer of wheelbarrows states that the average increase in price will be 5 per cent, despite the fact that costs have advanced 39 per cent over 1941 levels.

A stove company says its prices have not increased since 1941 and that the increase contemplated will be less than 10 per cent. Improved production facilities have enabled it to absorb most of the higher costs.

An automobile parts maker says the only increase contemplated is on parts for old model cars, which represents less than 5 per cent of the firm's total volume of business.

A spring manufacturer "expects to hold prices unless forced by higher costs. We expect to absorb part of the higher costs."

Officials of the companies questioned admit that demands for further wage increases or sharply rising material costs can knock their plans for holding prices steady into a cocked hat.

A manufacturer of special machinery says he contemplates no price increase but adds that this is "based on the assumption that labor and industry will hold their heads and not go wild . . . will make no changes in prices unless forced to by wildcat labor."

Another machinery manufacturer fears that increases in the costs of food and clothing will disturb labor and that union leaders will feel bound to demand new wage increases. A new wave of wage increases would make voluntary price control extremely difficult, he believes.

A company producing heating, ventilating and air conditioning equipment states it has only recently granted a wage advance to its workers and that the actual costs of higher wages will be added to its prices.

A steel spring manufacturer says prices of his product will depend on the prices charged by the steel mills for alloy steel bars.

A pipe and casing company is uncertain as to future prices, saying they will depend on the costs of raw materials, particularly steel.

A manufacturer of specialties perhaps sums up the attitude of the industry: "We will raise prices only to the extent necessary to provide for increased costs of labor and materials."

STEEL's survey covered a wide range of metalworking companies. Included were steel fabricators; manufacturers of consumer products such as small hardware, kitchen equipment and appliances, agricultural implements, automobile accessories, office machinery, toys and sporting goods; electrical equipment, machine tools and many types of industrial machinery.

HUTS HOUSE HOMELESS: Quonset huts provide temporary homes for hundreds of homeless in this Brooklyn, N. Y., housing project, sponsored jointly by the city and the federal government. Here rows of the war-developed units stretch along the flat-land areas, nearly ready for occupancy. Acme photo

Home Building Hits Near-Record Pace

More than 400,000 dwelling units started up to end of May, representing 34 per cent of 1946 goal. Demise of price control makes future use of subsidies to spur production of building materials uncertain

HOME building during the first five months of 1946, under the impetus of the Veterans Emergency Housing Program, came close to the all-time record in the peak year of 1925, according to National Housing Expediter Wilson W. Wyatt in his first report to the public, just released.

Whereas the 1925 record volume was achieved after a gradual rise over five years the 1946 step-up followed practically a dead halt in 1945. More than 400,000 new dwelling units of all types were started this year up to May 31, representing 34 per cent of the 1946 goal of 1,200,000 units to be started under the Veterans Emergency Housing Program.

With the strikes in the steel, coal and lumber industries out of the way, the program just has hit its stride, said Mr. Wyatt—provided the price situation does not get out of hand. He emphasized that all homes built henceforth will be carefully inspected during construction to insure quality and fair prices. Even so, said Mr. Wyatt, current prices are too high for many veterans, so that creation of an increased number of rental units is desirable.

Continued satisfactory execution of the Veterans Emergency Housing Program, said Mr. Wyatt, demands House approval of the Senate-passed Wagner-Ellender-Taft General Housing bill (S. 1592). That bill, he said, provides incentives for attracting large-scale building operators into the low-cost rental housing field.

Although the termination of OPA's price control authority on June 30 threw considerable uncertainty around the National Housing Agency's future rise of subsidies to encourage production of scarce building materials, present premium payment regulations which were placed in effect in June will remain effective at least through July.

There is no present intention to cancel them after July, according to National Housing Expediter Wilson W. Wyatt, but their long-range status will depend on whether price control is reinstituted, and on price movements in the industries covered by the premium payment regulations.

In the meantime, Mr. Wyatt and his staff continue work on the formulation of premium payment regulations on cast iron soil pipe and fittings, on hardwood flooring and on extended surface convectors (radiators of various types). Release of these additional premium payment plans will be contingent on what happens to price control.

It will be helpful, said Mr. Wyatt, if producers of building materials will adhere to OPA price ceilings until future arrangements for price control are determined.

While the National Housing Agency has authority under the Veterans Emergency Housing Act to request the CPA for directives by which certain blast furnaces would be operated under RFC subsidies to produce pig iron for the housing program, there are two questions which prevent such action. One is the fact that only a portion of the pig iron produced by certain furnaces under subsidy arrangements might go to the housing program. The other is the absence of a sufficient degree of assurance of price stability.

National Tube To Install New Plant Facilities

Extensive expansion program launched at Lorain, O., and Gary, Ind., Works. Additional bessemer capacity planned

TO BETTER meet future demands for steel pipe, the National Tube Co., Pittsburgh, subsidiary, United States Steel Corp., last week announced launching of an extensive program of improvements and enlargements at two of its plants.

C. R. Cox, president of the company, stated new facilities will be installed at the Lorain, O., Works and the Gary, Ind., Works.

An entire new bessemer steel plant, including three bessemer converters and all necessary auxiliary equipment, will be installed at Lorain to replace existing bessemer steel facilities in that city.

The new plant will increase National Tube's ingot capacity at Lorain from 1,884,000 tons to approximately 2,200,000 tons a year.

In recent years there have been many improvements in the methods of producing bessemer steel, resulting in a strong market demand for products made from such steel.

To Add New Seamless Mill

Improvements at Lorain also include installation of an additional seamless mill to produce pipe in the smaller sizes; additions and improvements in the equipment for production of pipe and boiler tubes; a blooming mill, a bar mill and a billet mill replacing two existing blooming mills and a combination rail mill. These developments will increase the pipe capacity of Lorain Works to the extent of approximately 150,000 tons annually, or around 15 per cent.

At the Gary plant where certain government-owned equipment installed during the war was recently purchased by National Tube, an additional seamless mill for production of small-size pipe will be installed as well as electric welding equipment for producing tubing up to 5-in. outside diameter. These new facilities, when integrated with presently-owned equipment, will increase National Tube's pipe and tube capacity at Gary by about 170,000 tons a year.

Completion of these two projects, soon scheduled to start, will require about two years, Mr. Cox estimated. It is expected that the new facilities, when completed and in operation, will provide additional employment at both Lorain and Gary.

In connection with concentration of galvanizing operations at the company's Lorain Works earlier this year, the production of galvanized pipe at Versailles, Pa., has been discontinued, operation at this latter plant now being limited to specialty items.

Census Bureau Reports Employment Rise in June

Employment of civilians in June totaled 56,740,000, an increase of 1,420,000 from May, the Census Bureau reported last week. The number unemployed also rose, rising 250,000 to a total of 2,560,000. Some 3,000,000 persons were reported in military service.

Gains in employment were attributed to an increase of 1,670,000 persons in the labor market as the result of school closing.

Of the 56,740,000 civilians reported employed in June, a total of 2,000,000 were not actually working when the census was made early in the month, being on vacation or idle due to strikes or other causes.

Non-farming employment rose 300,000 to a total of 46,760,000 and farm employment jumped 1,100,000 to a total of 9,980,000.

About 200,000 of the 250,000 increase in the number listed as unemployed were said by the bureau to be boys and girls of high-school age.

Dealing with veterans, the bureau found 8,420,000 engaged in non-farming activities and another 920,000 working on farms.

Still not looking for work were 1,500,000 veterans, including about 500,000 who were attending school, but the total was down by 200,000 from May.

Present, Past and Pending

■ INVENTORY REGULATIONS MAY BE TIGHTENED
WASHINGTON—Inventory regulations are expected to be tightened by the Civilian Production Administration should effective price controls not be restored. New rules will be worked up to prevent speculative hoarding and excessive exports of scarce goods.

■ MORE VESSELS ADDED TO NATION'S IDLE FLEET
WASHINGTON—Addition of 363 ships to the American merchant marine inactive fleet during the month ended June 15 increased to 1263 the number of reserve vessels at anchorages at Mobile, Ala., Suisan Bay, Calif., Tarrytown, N. Y., Puget Sound, Wash., Beaumont, Tex., and Portland, Oreg. During the like period 23 vessels were withdrawn for sale, return to former owners, or were returned to active service.

■ STRIKES HAMPERING GENERAL MOTORS DECREASE
DETROIT—Total suppliers' strikes affecting General Motors Corp. production in week ended July 6 dropped to 58, compared with 83 in previous week, 34 having been settled and nine new ones started.

■ STEELMAKING AT GENEVA PLANT TO START JULY 22
GENEVA, UTAH—U. S. Steel Corp.'s Geneva Steel plant purchased recently from the government blew in an additional blast furnace last week. Steelmaking is to be resumed July 22 and finishing mills will start in August.

■ RAILROADS SEEK RATE INCREASES ON FUELS
WASHINGTON—Railroads petitioned Interstate Commerce Commission last week for increases of 15 cents per net ton and 17 cents per gross ton over rates of June 30 on bituminous and anthracite coal, coke, and lignite effective on one-day notice. The roads state increases that became effective July 1 are inadequate.

■ JUSTICE DEPARTMENT RULES AGAINST PLANT SALE
WASHINGTON—Justice Department's antitrust division has ruled against the sale of the government-owned ordnance foundry at Bettendorf, Iowa, to American Steel Foundries, holding such would violate the antitrust laws.

■ PRODUCTION OF MINUTE STEEL BALLS ANNOUNCED
PHILADELPHIA—Production for immediate industry use of high-precision steel balls half the size of a pinhead and four times more valuable than gold, was announced last week by SKF Industries Inc. The minute balls are designed especially for new-type fountain pens, but they also will be available for delicate instrument bearings and other applications.

■ SENATE PASSES MATERIALS STOCKPILING BILL
WASHINGTON—Senate last week approved and sent to the White House S.752, Strategic and Critical Materials Stockpiling Act, which provides for the storing of strategic materials for the national defense.

Supply Shortages Present Chief Bar to Foundry Operations Gain

Substantial betterment noted in some directions despite scarcity of pig iron, scrap, core binder and other essential materials. Improved labor conditions encourage optimistic view of production prospects for last half of year

By WILLIAM M. ROONEY
News & Market Editor, STEEL

SUPPLY difficulties are hampering operations in the iron and steel foundry industry but production of castings, nevertheless, has improved in some directions recently with prospects encouraging for continued betterment over the remaining months of the year.

Except for a few isolated strikes, most of them described as minor, the industry is free of labor trouble. At the same time recent wage advances appear to have resulted in some betterment in worker productivity.

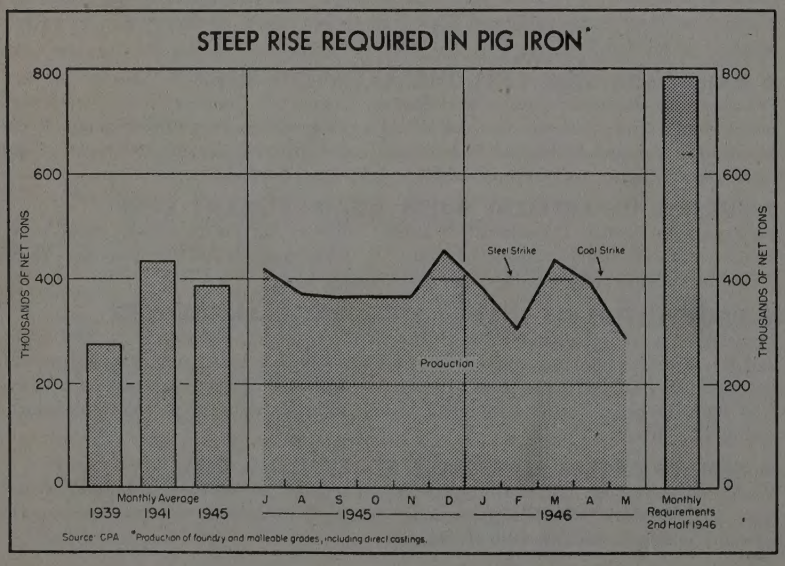
Shortage of labor still is reported in some production areas, but, generally, workers are more freely available, and, significantly, the grade of worker applying for employment is said to be much higher than was the case a year ago.

Biggest headache confronting castings producers involves supplies. Pig iron, scrap, core binder, pattern lumber and nails are difficult to obtain in desirable quantities at all times.

Pig iron supply falls considerably short of castings' producers needs and government reconversion officials have been trying to develop a plan which will help the foundries over the supply hump. In May, last month for which official figures are available, production of foundry and malleable grades declined 27 per cent to 288,000 net tons from the April level, the drop reflecting the effects of the coal strike. At that time it was estimated production of these grades would have to be stepped up between two and three times if reconversion needs were to be met, a feat considered highly unlikely.

Certain foundries are getting some help in their pig iron supply problem through a plan developed by the Civilian Production Administration by which iron is channeled to foundries for use in production of castings for housing and other critical reconversion programs. These must programs, it is estimated, will take at least 25 per cent of foundry and malleable pig iron output.

Scrap iron is in extremely tight supply and prospects are not too promising for early relief. Despite the scrap collection campaign, launched under government auspices, it is not believed conditions will materially improve in the near future. Passing of government price control, it is pointed out, has served to further restrict movement of scrap, with collectors tending to hold supplies pending clarification of the price picture. Foundrymen have been urging government agencies to bring large quantities of battlefield scrap to this country during the present period of shortage, but so far little has resulted from these urgings. High cost of handling and transporting this material imposes a difficult financial hurdle for the movement of large quantities to this country.



Another item in acute supply is cereal core binder, especially that derived from corn. It is estimated that the 1946 production of corn starch for domestic use will not exceed 1 billion pounds which is 25 per cent less than was available in 1943 and is about 33 per cent less than the 1.5 billion pounds needed by all industry this year. Recently a directive was issued by the Department of Agriculture to channel 6 million bushels of corn to wet millers and this may ease the supply situation somewhat. However, adequate relief is not expected before October or November when the new corn crop is milled. Meanwhile, the foundries are resorting to substitute binders, including that from soy bean.

Pattern lumber is in acute supply but less so than some time ago. The situation with respect to nails has not yet materially improved despite the recent increase in prices allowed on this product. Nail production goal set by CPA called for not less than 55,000 tons in June and at least 66,000 tons monthly by September. Foundrymen feel that should this schedule of production be attained supply conditions will be substantially eased by the fall.

Gray iron foundries are operating at the highest possible rate permitted by tight supply conditions and labor supply. Shipments into consumption have been rising steadily and some headway against order backlogs is reported. However, the gray iron shops are booked far into the future, at the end of April being reported holding unfilled orders amounting to 2,378,000 tons against a monthly production rate of 800,000 to 900,000 tons.

Malleable iron shops are estimated operating currently around 70 per cent of capacity with only two major strikes current in the industry. At the end of April unfilled orders of the malleable shops were reported at 275,055 tons with shipments at the rate of slightly in excess of 65,000 tons monthly.

Production in the steel foundries is reported at about equal to that in 1937. In May these shops shipped 129,000 short tons. At the same time unfilled orders amounted to 382,000 tons, a slight decrease from the backlog held at the end of April.

Since the passing of government price control individual foundries have been studying their books with a view to determining future price policy. Except for a few isolated instances the industry is holding at prices quoted as of June 30, and there is no sign that any general departure from this policy is likely pending determination of the future of govern-

ment price control. Even then, it is said, foundries are likely to move slowly on prices, making only such upward adjustments on individual jobs as costs dictate. In the steel foundry field it is understood some thought is being given to reinstitution of open price filing with the industy's national association in event OPA definitely is abandoned. This was the practice followed prior to government price control.

Urgent Programs Are Given Preference for Castings

To accelerate delivery of castings for the veterans housing program and special farm machinery products, orders for these products have been given preference on iron foundry schedules, the Civilian Production Administration announced last week. At the same time, the foundries must apply to CPA for the pig iron to be used in production of these castings.

The action, which applies to August and September production only, was accomplished by the issuance of direction 13 to the steel preference order (M-21). The new direction allows manufacturers of the products listed to certify by letter direct to the foundries that certain orders which they have placed for castings will be used to make critical items.

All "certified" orders must be treated by the steel mills, furnaces and foundries as rated orders, CPA said.

The new direction also provides that where manufacturers have not placed sufficient orders to provide the iron castings needed for their critical products orders during August and September, they may apply to CPA for authority to certify new purchase orders.

Manufacturers of critical products are not allowed to certify amounts which will call for delivery in August and September of a greater amount of iron castings than a manufacturer expects to actually put into production during that period. Farm machinery manufacturers may certify orders for castings which will be used in products that will be delivered by Oct. 31.

Foundries are required to put into production during August and September all of the tonnage of pig iron they have applied for on Form CPA 4475 for the critical products mentioned above.

Direction 13 further provides that in cases of extreme urgency, CPA may authorize placing of certified orders to fill limited requirements for the Army, Navy, Coast Guard, Maritime Commission, War Shipping Administration, Veterans Administration, Federal Public Housing Authority or for export.

Price Uncertainty Seen Contributing Factor To Increasingly Acute Shortage of Scrap

SHORTAGE of scrap is increasingly acute because of uncertainties which have arisen among some scrap dealers and yards following termination of the OPA, states Leigh Block, vice president, Inland Steel Co., Chicago, and a member of the Committee on Iron and Steel Scrap, American Iron and Steel Institute.

"Apparently a sizable tonnage of scrap is being held back in the hope that higher prices eventually may be obtained for it," said Mr. Block. "Steel mills are offering to pay the full OPA ceiling prices on scrap.

"It is entirely likely that a majority of collectors of scrap may begin moving scrap again before long, as soon as they are convinced that mills cannot afford to go beyond the previous OPA ceiling prices.

"If scrap is held back for any considerable length of time, the steel industry will be forced to shut down some of its open-hearth furnaces.

"Industries which generate scrap are endeavoring to help the steel industry by promptly releasing their scrap into the channels which get it back to the steel industry. Many farmers also are beginning to take their accumulated scrap to the nearest dealer in order to assist the production of steel."

The scarcity of scrap was first felt about a month ago, when the steel industry began to step up its operations after the end of the coal miners' strike.

First Half Steel Output Drops 15,778,368 Tons Below Output in Like Period of 1945

PRODUCTION of steel ingots and steel for castings during first six months of 1946 was 27,364,714 net tons, 15,778,368 tons below the corresponding figure for 1945, according to the American Iron & Steel Institute.

In the first half of this year, during which time the major strikes of coal miners and steelworkers occurred, the industry operated at an average rate of only 60 per cent of capacity. The average rate during the first six months of last year was 91 per cent, with production of 43,143,082 net tons.

Production of steel ingots and steel for castings in June was 5,660,386 net tons, at an average rate of 74.9 per cent of capacity. This compares with 4,072,452 tons produced in May, at 52.2 per cent of capacity, according to revised figures. June production last year was 6,840,522 net tons, at 87.1 per cent.

STEEL INGOT PRODUCTION STATISTICS

Based on reports by companies which in 1944 made 97.9% of the open hearth, 100% of the bessemer and 86.7% of the electric ingot and steel for castings production

	Estimated Production—All Companies								Calculated weekly	Number
	—Open Hearth—		—Bessemer—		—Electric—		—Total—		production all	of
	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	Net tons	Per cent of capac.	companies Net tons	weeks in mo.
1946										
Jan.	3,528,090	51.1	207,512	47.4	136,452	29 2	3,872,054	49.6	874,053	4.43
Feb.	1,300,944	20.9	25,905	6.6	65,668	15.6	1,392,517	19.8	348,129	4 00
Mar.	5,946,698	86.2	363,949	83.1	196,400	42.0	6,507,047	83.3	1,468,859	4.43
1st qtr.	10,775,732	53.8	597,366	47.0	398,520	29.4	11,771,618	51.9	915,367	12.86
Apr.	5,333,139	79.8	286,088	67.5	241,031	53.3	5,860,258	77.5	1,366,028	4.29
May	3,699,979	53.6	153,409	35.0	219,064	46.9	4,072,452	52.2	919,289	4.43
June	5,182,597	77.5	251,253	59.2	226,536	50.1	5,660,386	74.9	1,319,437	4.29
2nd qtr.	14,215,715	70.1	690,750	53.7	686,631	50.0	15,593,096	68.0	1,198,547	13.01
1st hlf.	24,991,447	62.0	1,288,116	50.4	1,085,151	39.8	27,364,714	60.0	1,057,778	25.87
1945										
Jan.	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,687	4.43
Feb.	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90.8	1,663,647	4.00
Mar.	6,927,377	96.9	398,351	79.8	382,237	82.4	7,707,965	95.0	1,739,917	4.43
1st qtr.	19,364,034	93.3	1,124,640	77.6	1,080,103	80.2	21,568,777	91.6	1,677,199	12.86
Apr.	6,541,097	94.4	372,952	77.2	377,877	81.4	7,291,926	92.8	1,699,750	4.29
May	6,663,577	93.2	402,100	80.6	386,075	83.3	7,451,752	91.8	1,682,111	4.43
June	6,129,266	88.5	379,807	78.6	333,217	74.2	6,842,290	87.1	1,594,939	4.29
2nd qtr.	19,333,940	92.1	1,154,859	78.8	1,097,169	80.6	21,585,968	90.6	1,659,183	13.01
1st hlf.	38,697,974	92.7	2,279,499	78.2	2,177,272	80.4	43,154,745	91.1	1,668,139	25.87

For 1945 percentages are calculated on weekly capacities of 1,614,338 net tons of open hearth, 112,658 tons of bessemer and 104,640 tons of electric ingots and steel for castings, total 1,831,636 tons; based on annual capacities as of Jan. 1, 1945 as follows: Open hearth 84,171,500 net tons, bessemer 5,874,000 tons, electric 5,455,890 tons.

For 1946 percentages are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of Jan. 1, 1946, as follows: Open hearth 81,236,250 net tons, bessemer 5,154,000 net tons, electric 5,500,290 net tons, total 91,890,540 net tons.

Dominion Watching U.S. Prices

Restoration of Canadian dollar to parity gives advantage to importers of United States steel and raw materials. Price ceilings may be raised

TORONTO, ONT.

LAPSE of OPA in the United States was reflected in Canada by the Foreign Exchange Control Board returning the Canadian dollar to parity with the U. S. dollar. While it was announced in the House of Commons last week that Canada is to retain price controls under the direction of Wartime Prices & Trade Board, it appears likely that if prices in the United States do any real skyrocketing, ceiling prices in Canada may be lifted well above present levels.

With the Canadian dollar again at par, importers of United States steel materials and products are favored with a reduction in price of 10½ per cent from former levels. However, it is pointed out that if steel prices at Pittsburgh are taken as the basing point, freight and sales tax alone would equalize the U. S. prices with that prevailing in Canada, and buyers of American steel in this country still would be faced with the payment of the duty. Thus importers still are faced with raw material prices several dollars per ton above consumers that obtain supplies of steel in the domestic market.

On the other hand, Canada and especially Ontario and Quebec, the largest consuming centers, depend largely on the United States for coal and iron ore, with the result that on these materials there will be a direct saving to buyers in this country of 10½ per cent against prices that prevailed a couple of weeks ago. Among the larger consumers, the Steel Co. of Canada Ltd., Hamilton, Ont., appears to gain the greatest advantage as most of its coal and iron ore come from the States, and this company also has been importing substantial tonnages of semifinished steel for further processing.

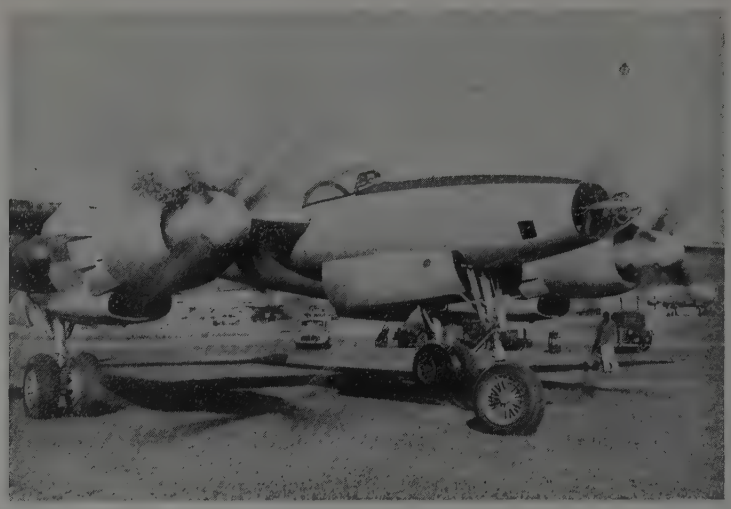
Algoma Steel Corp., Sault Ste. Marie, Ont., also imports a large part of its iron ore and all of its coal, but against iron ore imports it has been shipping ore into the United States from its own mines in the Michipicoten area. Thus while it may gain the advantage of the 10½ per cent discount on imports, it will lose the 10 per cent on exports that would originate from the former premium on U. S. funds. Dominion Steel & Coal Corp., Sydney, N. S., obtains the bulk of its iron ore from Newfoundland and its coal from its own mines in Nova Scotia, thus bringing of the Canadian and U. S. dollars to parity would have lesser effect on this company.

The iron and steel supply situation in Canada is critical and local mill representatives state their books are filled for third quarter and demand is more than double the supply. Imports of steel from the United States have been gaining in volume, but continue to run well below actual requirements. Canada depends entirely on the States for cold-rolled sheets, although the Steel Co. of Canada is putting in a unit for cold-rolled sheet production which is expected to be completed and in operation in about one year. Carbon bars and plate are in short supply, and there has been a general tightening in alloy bars in the past few days.

While the union did not call a strike at the Steel Co. of Canada at the beginning of last week, it appears that a general strike at the plants of Steel Co. of Canada, Algoma Steel Corp., and Dominion Steel & Coal Co., Sydney, may take place soon unless some settlement can be reached between the United Steelworkers of America-CIO and the companies. The Steel Co. of Canada has offered a pay increase of 10 cents per hour; Algoma Steel, 8 cents; and Dominion Steel & Coal has not announced a compromise offer. The union is calling for a minimum weekly pay of $33.60 and a 40-hour week.

At present some 34,000 workers are on strike in Canada, and unless agreements are reached at several other plants it is estimated that this total soon will run close to 100,000 workers on strike. A strike at the plant of Electro Metallurgical Co., Welland, began July 8, and negotiations are proceeding with the union and officials of Amalgamated Electric Co. and Canada Wire & Cable Co., Toronto.

A tie-up of the Canadian basic steel industry through strikes would create much greater chaos in Canadian industry, which already is having serious problems in obtaining all types of steel materials.



CRASHES IN TEST FLIGHT: The XF-11, reputed to be one of the world's fastest long-range planes, is shown just before it took off on its maiden flight, during which it developed engine trouble and crashed near Los Angeles. Designed and built by Howard Hughes, who was at the controls when it crashed, the plane had a speed of more than 400 mph

Farm Machinery Production Increases 20.3 Per Cent

Production of farm machinery increased 20.3 per cent during May to a total of $58,469,468 compared with $48,591,534 in April, according to the Civilian Production Administration. July production is expected to exceed the production peak established in January at $61,199,366 because CPA's recently established selfcertification program providing priorities on steel for manufacture of farm machinery became effective this month.

70,000 Tons of Copper Released By Government

Shortage seen eased by RFC action and by increasing production. Lead and tin also made available

SUBSTANTIAL improvement in the movement of copper to consuming industries is expected to follow last week's action of the Reconstruction Finance Corp. in releasing 70,000 tons of government-owned copper for immediate delivery.

The RFC, through its Office of Metal Reserves, released the metal at the old OPA ceiling price of 14⅜ cents a pound, thus re-establishing a price in the copper market which had been in a state of confusion since the lapse of price controls. Domestic producers indicated they would follow the lead of RFC on prices.

Because of prolonged strikes at mines and refineries, domestic production of copper has been at a very low level in recent months and the acute shortage of the metal became a principal bottleneck in many metalworking plants. Supply of copper bars in June was only 10,000 tons, against requirements for 50,000 to 60,000 tons. Release of the large tonnage of foreign copper by the government and the resumption of production by domestic mines and refineries is expected to ease the supply situation quickly.

Extent to which the RFC will be able to release copper from its stockpiles in future months is uncertain. Government reserves shrank from 539,000 tons on Jan. 31 to 300,000 tons on June 30, as result of releases for civilian production exceeding receipts. At the end of June, the government's contract with Chilean producers expired and at present only two contracts with foreign producers are in effect. These call for only limited amounts of copper, 2000 tons monthly from Mexico and 500 tons monthly from Africa.

RFC also has authorized the release of 7965 tons of government-owned lead for July domestic use at 9½ cents a pound, New York. This price is the same as established by domestic producers following the lapse of OPA when major producers raised their quotations 1¼ cents from the old OPA ceiling of 8¼ cents.

Lead mines and smelters have been given CC ratings on orders for capital equipment and maintenance, repair and operating materials by the Civilian Production Administration in an attempt to bolster domestic production, seriously disrupted by strikes and price ceilings.

Zinc prices also have been raised 1¼ cents a pound to 9½ cents, following the removal of price controls. Last week, zinc people were anticipating the RFC would release some government-owned zinc at this price.

RFC has released 5105 tons of tin for July shipment at a price of 52 cents a pound.

Earlier, the Civilian Production Administration had increased third quarter pig tin quotas 10 per cent over second quarter quotas. At the same time CPA tightened some of its controls on the distribution of tin. New controls on secondary tin permit manufacturers to use the same amount of tin-containing metals on processing and manufacturing operations as in the third quarter of 1944. Special quotas will be assigned those who were not in business at that time.

Electrical Manufacturing Recovering from Strikes

The nation's electrical manufacturing industry is rapidly overcoming strike-enforced production delays and material shortages, according to Gwilym A. Price, president, Westinghouse Electric Corp., Pittsburgh.

Westinghouse Electric Appliance Division is now turning out approximately 1000 refrigerators a day—about 50 per cent of its normal prewar output—and is even exceeding its prewar record production of electric irons and roasters.

Steel Price Study To Be Resumed if OPA Is Given New Lease on Life by Congress

IF CONGRESS acts to restore to the OPA enough of its former pricing authority, and if the bill is signed by the President, one of the first acts of OPA's Metals Division will be to resume talks with the General Steel Products Industry Advisory Committee to lay the basis for a determination whether steel prices should be advanced further.

John W. Snyder, while director of the Office of War Mobilization & Reconversion, in Directive 96, authorized the OPA to increase steel prices, retroactive to Feb. 15, by an average of $5 a ton. At that time he also instructed the OPA to review the effect of these price increases upon steel earnings over a period of "not less than three months" beginning Mar. 1.

In the meantime, the OPA is marking time; in response to President Truman's request the staff is standing by to resume its price control activities if Congress so authorizes.

GOVERNMENT CONTROL DIGEST

CIVILIAN PRODUCTION ADMINISTRATION

Rated Orders: Interpretation 2 to priorities regulation 1 provides that when no OPA ceiling price is in effect "there can be no discrimination in price against a rated order, or between rated orders of different customers of the same general class." When a price increase occurs after a rated order is accepted, the seller must continue to treat it as a rated order if the purchaser is willing to meet the increased price. A seller must not remove a rated order from his shipping schedule until he has given the buyer adequate notice of his intention to do so and the buyer has had not less than seven days to agree to the new price. (PR-1; CPA-460)

Merchant Pig Iron, Castings: Manufacturers of certain farm machinery, certain housing products, and railroad brake shoes are permitted to certify orders with preference ratings for gray and malleable iron castings, and foundries are allowed to certify orders with preference ratings for merchant pig iron for use in such castings. Certified orders must be scheduled for production in preference to all other orders except for orders covered by specific written directives of CPA. Certification is limited to orders for delivery in August and September. (M-21, Direction 13; CPA 18120)

Plumbing Fixtures: To help builders of veterans' housing obtain kitchen sinks, lavatories and water closets, the CPA has added these fixtures to the list of building components to which HH (veterans' preference) priority ratings apply. The action was taken by amendment of Direction 2 and Schedule A of Priorities Regulation 33. (PR-33; CPA-LD-136)

Pig Tin: Third quarter, 1946, pig tin quotas have been increased 10 per cent over second quarter, and quotas have been combined for all products, to allow manufacturers increased latitude in making products containing tin. For the first time, controls have been established on secondary tin to provide more equitable distribution of all tin-containing metals. (M-43; CPA-LD135)

WAR ASSETS ADMINISTRATION

Small Business Firms: Reconstruction Finance Corp., as successor to the Smaller War Plants Corp., has been granted an acquisition priority second only to that of federal agencies which desire the installation for their own use. The regulation does not invalidate, however, options or rights of first refusal to the wartime lessee of the property. Sales to RFC will be contingent upon a certification that the purchase and subsequent resale is necessary to the promulgation of the competitive position of small business or will materially benefit RFC in its duties as the successor to SWPC. The following sequence is in effect: First, federal agencies; second, RFC for resale to small business; third, state and local governments; and fourth, nonprofit institutions. (Reg. 10; WAA-370)

Social Security Provision To Be Broadened Under New House Bill

Provides for increase of payroll tax for old age and survivors insurance to 1½ per cent against both employers and employees, effective Jan. 1, 1947. Maritime workers would be covered by unemployment compensation program

FOLLOWING a series of decisions based on recommendations made by various witnesses during recent hearings, the House Ways & Means Committee has instructed its staff to write legislation which would broaden present provisions of the Social Security Law. The intention is to get the proposed bill approved while both the House and Senate still are in session. It will provide:

1—An increase in the old age and survivors insurance payroll tax from the present 1 per cent to 1½ per cent, effective Jan. 1, 1947, against both employers and employees. This increase is in lieu of the 2½ per cent rate which automatically would go into effect on that date unless Congress decides differently.

2—Inclusion of 200,000 to 250,000 maritime workers in the unemployment compensation program.

3—Inclusion of all veterans' families under the old age and survivors insurance provisions for three years without cost to the veterans.

4—Repeal of the 1943 Revenue Act provision whereby the Treasury guarantees the solvency of the old age and survivors insurance fund. This guarantee was put into the law at the time Congress froze the 1 per cent payroll tax rate during the war.

5—A substantial increase in federal contributions for the needy aged and blind and in the amount of relief for dependent children. For the aged and blind the bill would raise from $20, the present maximum, to $30 a month the amount of money the federal government would put up for matching by the states. For dependent children, the first child in a family would be able to get a maximum, under federal-state participation, of $27 monthly compared with a present $18 maximum, and each additional child could get up to $18 compared with the present $12 maximum.

The proposed bill will substitute for the present 50-50 federal-state matching setup a variable arrangement whereby the federal government will provide up to $2 for each $1 of state money in states with low per capita income. By this change the cost to the federal government of the public assistance program would be increased from about $400,000,000 annually, as at present, to more than $500,000,000. Public assistance now is being received by approximately 2,050,000 needy aged, 660,000 dependent children and 55,000 blind.

JOINT ATOMIC BOARD: Army and Navy have announced establishment of a joint board to co-ordinate research and development of atomic weapons and other new aids to national defense. Members, seated, left to right: Assistant Secretary of Navy W. John Kenny; Secretary of War Robert P. Patterson; Dr. Vannevar Bush, director of the Office of Scientific Research & Development, who is chairman of the board. Standing: Dr. Lloyd Berkner, Carnegie Institution; Lt. Gen. Ira C. Eaker, deputy commander, Chief of Air Staff, AAF; Adm. Dewitt C. Ramsey, vice chief of naval operations; Maj. Gen. Henry S. Aurand, chief of the Research & Development Section, War Department. NEA photo

Extend SPA Regulation 17

Pending enactment of a new law by Congress concerning the stockpiling of strategic minerals, metals and materials, the War Assets Administration has extended from July 1 until Aug. 1 the expiration date of SPA Regulation 17, which governs the disposal of surplus property of this type.

The regulation provides for the stockpiling of critical and strategic materials needed by the Army and Navy for defense purposes, although civilian deficiencies in minerals and metals essential to the peacetime economy will be taken care of before any such transfer is made.

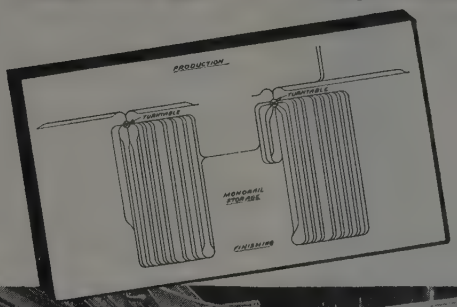
Plan Mobilization

At a recent White House conference, Richard R. Deupree, chairman of the Army and Navy Munitions Board, informed the representatives of three industrial groups that the board wants them to share the responsibility for organizing industry in the interest of quick mobilization in case of a future war emergency. Those present from industry were Eugene E. Wilson, president, Navy Industrial Association; LaMotte T. Cohu, president, Aircraft Industrial Association; and Frederick H. Payne, vice president, Army Ordnance Association.

Service officers who attended were Maj. Gen. Edward M. Powers, assistant chief of Air Staff for Supply; Maj. Gen. Everett S. Hughes, chief, Army Ordnance Department; and Vice Adm. Edward L. Cochrane, chief of the Navy Bureau of Ships. President Truman also was present and addressed the gathering on the need for careful planning to insure effective industrial mobilization if it is needed.

While no definite program was laid

FLEXIBILITY



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Here is another of the hundreds upon hundreds of handling problems efficiently and economically solved by American MonoRail Overhead Handling Equipment.

THE PROBLEM: To eliminate manual handling of reels from production machines to storage, from storage to finishing, from finishing to storage or shipping as required.

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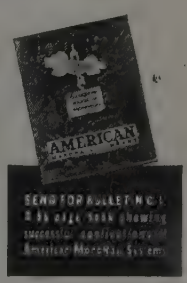
What is your handling problem? American MonoRail Engineers come up with the answer to efficient and economical handling ninety-nine times out of a hundred. We invite your inquiries.



THE AMERICAN MONORAIL COMPANY

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TESTIFY ON WAR PROFITS: Col. John Slezak, left, former executive officer of the Chicago ordnance district, and Brig. Gen. T. S. Hammond, former chief ordnance officer, are pictured here as they appeared before the Senate War Investigating Committee which is probing into the war profits of midwestern "paper empire" firms. NEA photo

down, the meeting was viewed as heralding a new type of organized effort in which the three associations will work with each other, and with the Army and Navy Munitions Board, on problems having to do with mobilization of an effective industry in case of another war.

Financing Reconstruction

President Truman has appointed a committee of industrialists and bankers to make a survey and recommendation on the financing of reconstruction. It will work closely with the National Advisory Council, charged by the White House with the duty of formulating national policy on foreign lending.

"I have appointed this committee of citizens of knowledge and experience because our foreign trade, export and import, must in the long run be privately handled and privately financed if it is to serve well this country and world economy," said the President.

"It is true that for the immediate present governmental help is needed in order to get our foreign trade policy under way. But I am anxious that there shall be the fullest co-operation between the governmental agencies and private industry and finance. Our common aim is the return of our foreign commerce and investments to private channels as soon as possible."

The committee is as follows: Herbert H. Pease, president, New Britain Machine Co., New Britain, Conn.; Champ Carry, president, Pullman-Standard Car Mfg. Corp., Chicago; Walter J. Cummings, chairman, Continental-Illinois National Bank & Trust Co., Chicago; L. M. Giannini, president, Bank of America, San Francisco; Paul G. Hoffman, president, Studebaker Corp., South Bend, Ind.; Edward Hopkinson Jr., partner, Drexel & Company, Philadelphia; Fowler McCormick, chairman, International Harvester Co., Chicago; Irving S. Olds, chairman, U. S. Steel Corp., New York; Gordon S. Rentschler, chairman, National City Bank of New York; A. W. Robertson, chairman, Westinghouse Electric Corp., Pittsburgh; Winthrop W. Aldrich, chairman, The Chase National Bank of the City of New York; Tom K. Smith, president, The Boatmen's National Bank of St. Louis.

Industrial College Graduates

Following a six-months' course of training in the principles of industrial mobilization for war, the Industrial College of the Armed Forces on June 27 graduated its first class. This consisted of 85 Army, Navy and Marine Corps field officers.

During the course special seminars were devoted to problems of the iron and steel, gray iron casting, machine tool, nonferrous metal, aviation, synthetic rubber and numerous other industries that are of vital importance in time of war.

Another group of field officers from the various services is being organized to take a similar course to start in September. For the next class the course will last 10 months, and the plan is to call in many more industrialists to tell the class about problems of their industries.

Bans Federal Strikes

The rider under which federal money cannot be paid to employees who strike against the government has brought quick action. Originated by the Senate Appropriations Committee, this rider has been inserted in all the big money bills. It was drafted largely as a result of a resolution adopted by the left-wing United Public Workers—CIO which gave Abran Flaxer, president, the power to call strikes against the government. The union board now has deprived Mr. Flaxer of this power as far as the federal government is concerned, so that the 25,000 government employees can sign an affidavit that they are not members of an organization of federal workers which asserts the right to strike against the federal government. Thus they will not lose their jobs.

This action bans only the power to call strikes against the federal government. The door still is open to strikes by the union against state, county and local governments.

Tires May Be Exported

Beginning with the third quarter of 1946 the Limited Distribution License procedure will be extended to cover exportations of new passenger car, truck and bus tires, according to announcement by the Office of International Trade, Department of Commerce. Under this procedure the OIT will issue a single limited license quarterly upon application by any manufacturer or traditional exporter of new tires.

NAM Charges Government Firms Cost Taxpayers Additional $2 Billion

Unpublicized deficit called a "serious discrepancy" by manufacturers' association. Asks Congress to keep closer watch on budgets of U. S. corporations. Suggests some should be eliminated now

GOVERNMENT-OWNED corporations will cost the nation's taxpayers $2 billion more than they have been told would be the case, the National Association of Manufacturers charges in disclosing a "serious discrepancy" in the Bureau of the Budget's January and May estimates for fiscal 1947.

Submitting the analysis of its research department to the chairman of the Senate Appropriations Committee, NAM said that "the budgetary estimates of government expenditures, in January, included $802 million out of checking accounts with the Treasurer," but that in the corporations supplement to the budget, released in May, "the borrowing of corporations from the Treasury is estimated at $2800 million."

The estimated change in the cash balance does not explain the difference between the two figures, the report said.

"The only explanation of this discrepancy of $2 billion," it observed, "is that the Bureau of the Budget changed its mind to this degree in the intervening four months."

William A. Weaver, chairman of the committee on government corporation and fiscal reorganization and president of the Arabol Mfg. Co., of New York, emphasized, in releasing the report, that all taxpayers and businessmen should be vitally interested in expenditures made by government corporations and declared "now is the time to call for elimination of many of them."

With the corporation budgets currently in the Senate, the NAM spokesman expressed his hope that Congress will have something to say about the unpublicized additional deficit.

Mr. Weaver noted that the official estimate of the total loss of the government corporations, and which come out of the taxpayers' pockets, is $4 billion, under the programs proposed for fiscal 1947.

"Some lack of frankness," the NAM report said, "is involved in the failure to point out that the January budget total of expenditures must be increased by $2 billion," to reflect the added amounts proposed in the May budget.

"The study also points up the fact that in the future, Congress and the public will be kept aware of the cost to the country of operating those agencies whose operations hitherto have been confined to their own narrow orbit without the full knowledge of the Congress or the public."

A breakdown of the proposed budget shows that of all the wholly owned government corporations, four make up the substantial components in the total expenditures: Reconstruction Finance Corp., the Commodity Credit Corp., the Export-Import Bank, and the activities of the Federal Public Housing Authority under the veterans' housing program.

Mr. Weaver commented that "one of these, the RFC, was criticized severely a few days ago by the Comptroller General for lack of control over some $7 billion in property investments, nearly $1 billion in inventories, cash receipts, rental earnings and surplus property disposal activities.

NAVAL STATION TO BECOME UNIVERSITY: War Assets Administration has authorized the Navy Department to grant a temporary permit to the State of New York to use the $50 million Sampson Naval Training Station as a university for veterans. Shown conferring on the transfer are, left to right: Rear Adm. Carl H. Cotter; Brig. Gen. John J. O'Brien, deputy administrator, WAA; Sen. James M. Mead, New York; W. John Kenney, assistant secretary of Navy; Vice Adm. William S. Farber

Belgium, Luxemburg Seek Export Markets

Agreements under negotiation call for shipments of steel to Sweden and South America. Production increasing slowly as coke supplies improve

LONDON

BELGIUM and Luxemburg are negotiating commercial agreements with a number of countries, in which steel plays an important part.

One such agreement with Sweden is reported to cover exports of Belgian and Luxemburgian steel totaling some 250,000 tons for 1946, plus a certain tonnage of rolled products such as tubes, cold-rolled steel, etc. Before the war Sweden used to obtain these products from Germany.

Negotiations are also being conducted with South America, especially Argentina, Brazil and Chile, and also with Spain. When such agreements are satisfactorily concluded several hundreds of thousands of tons of Belgian and Luxemburgian steel will find ready markets in the countries involved.

Certain difficulties stand in the way, however, particularly in regard to internal conditions in Belgium. Production has not yet reached prewar levels and leading works already have their export order books well filled and some are withdrawing from the market. These conditions are likely to improve as more blast furnaces are being relighted as coke supplies are gradually increasing.

Belgian Coal Price To Rise

Belgian prices tend to increase and it is almost certain that a recent government measure tending to remove subsidies will result in an increase of 40 per cent in the price of coal. This is bound to react on steel prices and will make it more difficult for Belgium to compete in export markets with the exception, perhaps, of a few importing countries with whom commercial agreements will have been made.

About the middle of June, Belgian steel bars were quoted 2200 Belgian francs ($50) per metric ton, while in France the price was 4700 French francs ($39.10). Hoops in Belgium were 2450 Belgian francs ($55.70) and 5255 French francs ($43.80) was the price quoted in France. If export prices reflected such differences French makers would have a considerable advantage over their Belgian competitors. In June also, the Belgian domestic price for galvanized sheets was raised by from 40 to 50 per cent.

This house of steel construction, designed by the British Iron & Steel Federation, is being constructed in large numbers in United Kingdom urban areas to replace the 200,000 homes destroyed and the 250,000 seriously damaged by air raids

Output of steel ingots and castings in Belgium during the first four months of the year was 617,000 gross tons; production in April was 164,000 tons as against an average monthly of 187,000 tons in 1938.

CZECHOSLOVAKIA—The iron and steel industry in Czechoslovakia is government operated by an organization in Prague styled as "Ceskoslovenko Hute." It is reported the present rate of output of the two leading works, Vitkovicke and Banska a hutni, is on the basis of one million tons of steel ingots and castings per year.

FRANCE—Acceptance by the new Bidault government of the principle of an all-around increase of wages by about 15 per cent may eventually result in higher prices for steel. Already the price of certain products is on the same level as American prices. Late in June, for instance, the base price of galvanized sheets for consumers and retailers in the home market was fixed at 13,680 French francs ($114) per metric ton for lots of 10 tons and over.

In a reply made recently by the minister of production in the French Chamber it was stated that the subsidies for the iron and steel industry was 6 million francs ($50,000) for the domestic market and 4,500,000 francs ($37,000) in regard to import prices.

Output of pig iron in France during the first five months of the year was 1,051,000 gross tons; the May output was 248,000 tons as against an average monthly of 498,000 tons in 1938. For steel ingots and castings the output for the first five months was 1,411,000 tons; the output for May was 337,000 tons compared with a monthly average of 503,000 tons in 1938. The output has been increasing consistently from month to month.

GERMANY—The output of pig iron in the British occupied zone of Germany for the first four months of the year has been given as 568,000 gross tons, and the output of steel ingots and castings as 640,000 tons.

ITALY—Present rate of production of steel in Italy is on a basis of 700,000 tons per year, mostly electric steel.

Swiss Approval No Longer Needed for Steel Exports

The Swiss government has abolished its requirement of approval on foreign orders before products of the iron and steel industry may be exported or manufactured on foreign contracts, according to a notice to the Department of Commerce.

Jap Iron, Steel Output Only 3 Per Cent of Peak

Japanese iron and steel production continues far short of urgent current needs. Pig iron production in March was approximately 3 per cent of the wartime peak. Steel production was at approximately the same rate. Increased operation of electric melting furnaces continues

handicapped by a limited supply of graphite electrodes. Steel rolling mills continue to concentrate on production of roofing sheets, small-diameter pipe and wire rods.

British Surplus Machines Sold Valued at £7 Million

Twenty-five thousand surplus machine tools had been disposed of by the United Kingdom up to May of this year, according to unofficial information received by the Department of Commerce. The machinery was valued at more than £7,000,000.

About 80 per cent of the British machine tool exports of surplus stock in 1944 and 1945 went to the Soviet Union, it was stated, with total exports for those years valued at £7,800,000 and £4,500,000, respectively.

The United States, meanwhile, furnished £198,000 of machine tools imported by the United Kingdom in January. Total imports were £345,000, according to the report.

Slight Decrease Reported In French Ore Production

Output of merchant ore in France in February totaled 1,150,537 metric tons, compared with 1,154,347 metric tons for January of this year. Nearly all output was from the Lorraine mines. During February 481,647 tons of ore were delivered to mills, and 330,589 tons were exported, largely to Belgium and Luxemburg. Stocks in February totaled 6,196,539 tons, the largest since the end of the war.

Foreign Notes . . . .

Cuba has reduced the import duty on rolled sheets of wrought iron and steel by 90 per cent, when imported for manufacturing uses, the Department of Commerce has announced. The rates were formerly 84 cents per 100 kilograms for sheets 3 or more millimeters thick and 90 cents per 100 kilograms for sheets with thickness up to 3 millimeters.

—o—

Farm machinery procurement for this year from the United States, under a program of the Iraq government, totals about $480,000, and will cover the cost of 87 tractors, trailers, accessories and spare parts, according to an official statement. Estimates of machinery used in 1945, it was stated, included 150 tractors of 35 horsepower each, 150 reapers and 40 combines. It was reported that the country could effectively use 2000 tractors.

—o—

Semiprefabricated steel fishing vessels have been proposed as a means of meeting the need for these craft in the United Kingdom. Standardized steel hulls, 65 ft long, 18 ft wide and 9 ft 6 in. deep, to cost between £7500 and £8000 when completed have been suggested. Frames, plates and other parts would be delivered to the yards ready for welding or assembling.

—o—

Foreign shippers of iron and steel products to Valparaiso, Chile, are warned to take special care in marking rolls and bundles of these items to avoid loss upon arrival. The prewar European practice of marking with different colored painted stripes has been suggested to provide rapid identification.

—o—

Brazil has reinstated its requirement for import licenses on used and reconditioned industrial equipment. As under the former control system, suspended in December, 1945, in addition to the import license needed for used machinery from the United States, a certificate of inspection from a recognized U. S. engineering firm is required. The certificate must be certified by the Office of the Commercial Counselor of the Brazilian Embassy in New York.

—o—

British shipbuilding interests are making a drive to get into the Chilean market for merchant tonnage, according to American observers at Santiago. These observers report that the Confederation of Shipbuilders of Great Britain has a mission in Chile to promote the sale of British-built ships. Representatives of the Chilean merchant marine, discussing the matter at a recent conference of Chilean shipowners at Valparaiso, stressed the need of renovating the country's fleet within 10 or 12 years, the cost of this undertaking being estimated to exceed 155 million Chilean pesos.

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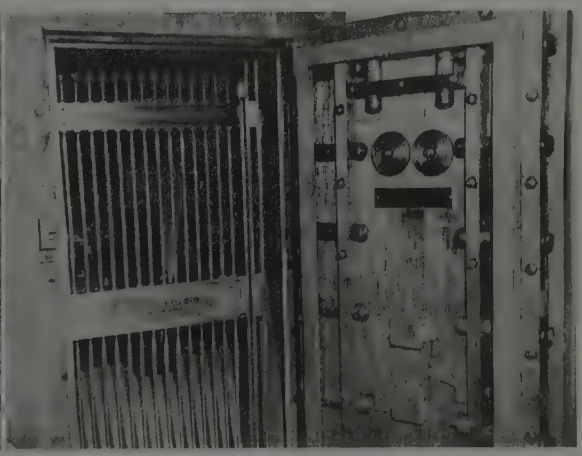
Government owned electric generating equipment in Montevideo, Uruguay, is being repaired with spare parts and other replacements to offset depreciation which has resulted from use of substitute fuels.



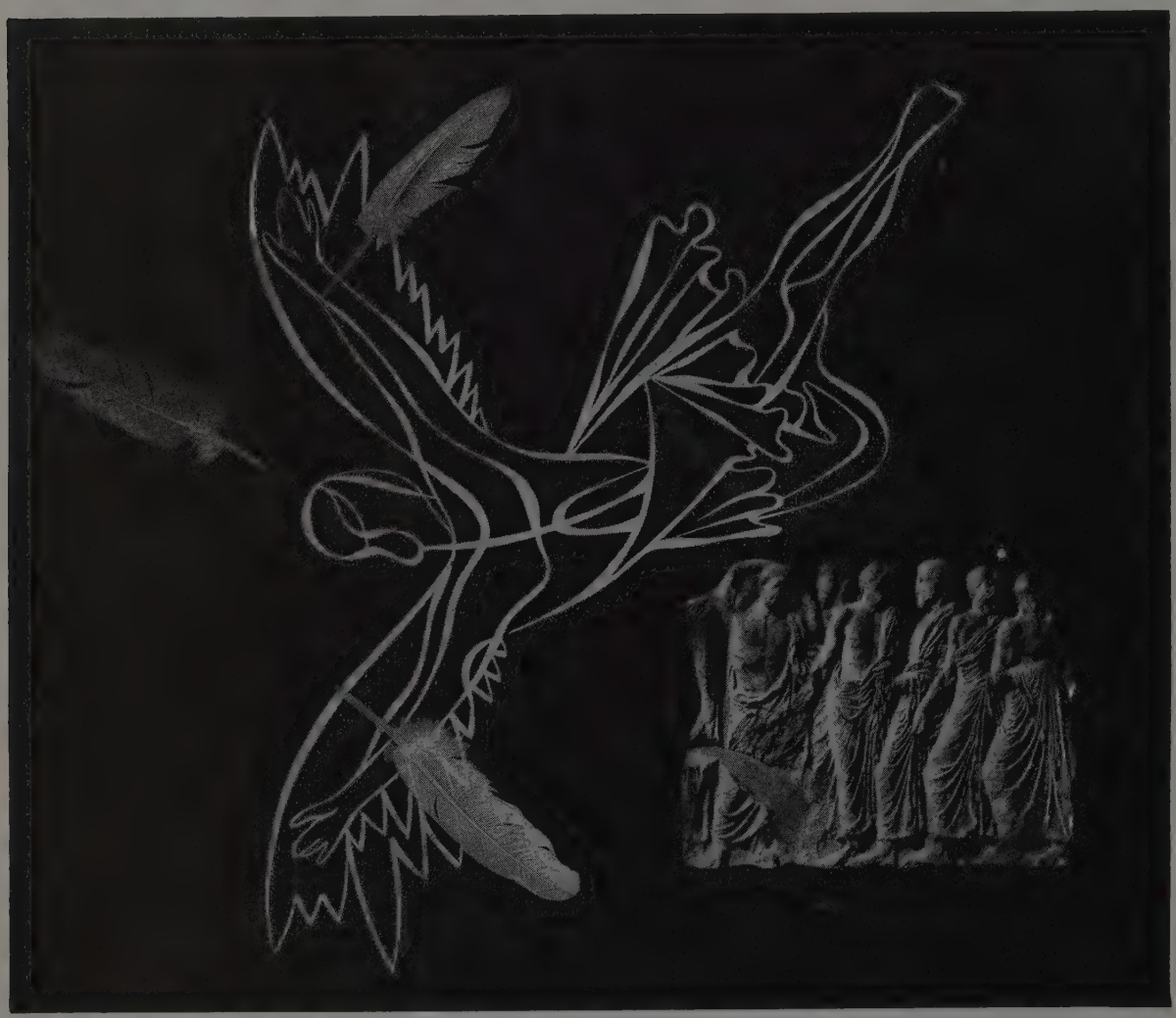
VAULTS SURVIVE ATOMIC BOMB: Bank vaults in Hiroshima survived the blast and heat of the atomic bomb despite the fact the reinforced concrete bank building was blasted to rubble. Shown at left is the Teikou bank after the blast, with four vaults, made by Mosler Safe Co., Hamilton, O., remaining intact. At right is a close-up view of one of the steel bank vault doors

BETTER SURE THAN SORRY

According to olden legend Icarus flew too near the sun, only to spin in when his wings failed to stand the stress at high temperature. Here was an early case of serious trouble due to misplaced confidence in materials.

There are many applications for steel nowadays where creep strength (the ability of steel to keep working when the heat is on) makes a tremendous difference. Molybdenum steels, being noted for their creep strength, are economical preventives of high temperature trouble.

Icarus had no accurate data on materials to guide him. A wealth of tested, practical facts about Molybdenum steels for elevated temperature service is available on request for today's engineers and designers.



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MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

mirrors of MOTORDOM

Brokers offering Detroit steel consumers fall deliveries on substantial tonnages of sheet and strip for fee, but brokers' names do not appear on mill books. First half automobile production was only 27 per cent of expectations

DETROIT

AS IS usually the case when demand far counterbalances supply in any commodity, the boys with "special deals" to offer are appearing in the steel market. Their activities could hardly be classified as "black market" but certainly they are somewhat unconventional. Already a good many steel buyers here, unable to place tonnages with mills over the balance of this year, have received letters offering "substantial" tonnages of sheet or strip, for delivery from mills this fall, through brokers. The stickler is, however, that $2 per ton cash deposit must accompany each order, and to the regular mill price is tacked a brokerage fee ranging from $10 to $14.

Presumably the $2 per ton deposit will be deductible from the brokerage fee, which would make the asking price for cold-rolled sheets around $80 per ton, against a mill price of $68.50, and a warehouse price of $94.50, the latter of course being the base price on orders of 400-1499 pounds. Obviously no warehouses are in a position to offer buyers any substantial tonnages.

So far as is known, no deliveries have yet been made on any of these brokerage deals. A mill representative is authority for the report that one buyer was told by a broker he would be given actual car numbers of the shipments, and was given the name of the producing mill. A check with this mill showed no record of the broker's name or any tonnage due him. One quipster remarked, "Maybe the broker is buying from the boss' roller and taking the stuff out the back door of the mill."

It would appear entirely possible for some purchaser who had a favorable position on a mill's books for tonnage of sheet and strip, material which might have been ordered from several sources, to transfer title to a broker, at a slight consideration naturally, and the latter could then resell to another fabricator for an additional slight consideration. Under such an arrangement, the broker's identity would not be revealed in the transaction. Nothing illegal seems to be attached to the procedure, rather, it is just another outcropping from the distorted postwar economic conditions. In the long run, it would appear far better for steel tonnage to be put to use once it is rolled, rather than to be stored away as a commodity hedge against further inflation.

At least two of these steel brokers are operating currently around Detroit, possibly more. One is reputed to be a former Air Corps expediter, now putting his wartime contacts to good use. Some mill sales people doubt they will be able to make good their delivery promises, or that any appreciable tonnages, in the automotive sense, are involved.

Automobile Production

Tabulated by Ward's Automotive Reports

Passenger Cars and Trucks—U. S. and Canada

	1946	1941
January	121,861	524,073
February	83,841	509,332
March	140,777	533 878
April	248,318	489,856
May	247,620	545,321
June	214,511*	546,278
Week ended:		
June 22	54,475*	133,565
June 29	66,913*	127,926
July 6	47,365*	96,457
July 13	70,000*	114,318

*Preliminary

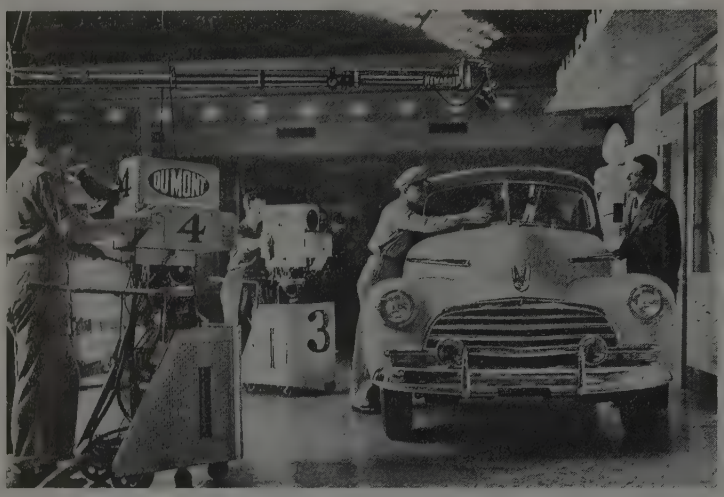
Speaking of flat-rolled steel, some qualifications should be applied to figures cited in these pages for June 17. In making the prediction that by the end of this year the automobile industry will be able to buy all the sheet and strip it needs for any contemplated production level, it was mentioned the steel industry has rated capacity for over 36,000,000 tons of hot-rolled and cold-rolled flat products, a figure taken from statistics compiled by the American Iron and Steel Institute for its 1945 directory and published in STEEL last Dec. 17. The total was correct insofar as it went, but a change in the method of rating capacities of finishing mills effected since the 1938 calculations requires further interpretation of the figures. Thus, capacity figures now comprise the total tonnage of each product which could be produced under full operations, assuming exclusive use of all available facilities and without regard to the availability of ingots.

Obviously this necessitates a downward revision of actual capacity versus theoretical capacity, since sufficient ingot production could not be diverted to sheet and strip to permit rolling 36,000,000 tons. Industry sources figure that peak annual flat-rolled steel production, not counting tin or terne plate, is something nearer 16,000,000 tons. This is of course the explanation why, although ingot production proceeds around the clock seven days a week, most sheet and strip mills operate only one or two shifts and often not for a full week. Using the figure of 16,000,000 tons and consigning 40 per cent to the automotive industry, about 6,400,000 tons would appear available. On the basis of a rough average of one ton per vehicle, this would permit production of 6,400,000 cars and trucks annually, within the limits of present steel capacity.

Steel Capacity Is Poor Guide

This figure checks pretty well with the latest thinking of automobile industry executives who are at the moment exerting all kinds of pressure on steel sources. As pointed out previously, however, due to the scores of other supply limitations, it is dangerous to base peak motor vehicle production estimates on steel capacity. Seldom if ever has the steel industry been unable to satisfy automotive demand over any sustained period, and with a considerable margin to spare. Already hints are heard of automotive buyers becoming finicky over steel finishes and other specifications. They would like sheets rolled with a little different finish on one side than on the other, so that they can be fed into dies this way and not that way, etc.

Taking a look at the first six months of the year automotive-wise, the Automobile Manufacturers Association reports production for the period was only 27 per cent of expectations, or 2,425,000



CHEVROLET SPONSORS TELEVISION BROADCAST: Admittedly as an experiment to evaluate the possibilities of television as an advertising medium, Chevrolet is sponsoring a series of television broadcasts. Shown above is a scene from one of the programs being staged in New York

units behind schedule. It is needless to review the reasons, but some further effects are interesting to note. Payrolls were only 50 per cent of expectations, or around $431.8 million. Man-hours worked were off 51 per cent, or about 311 million. Employment now includes 456,292 hourly workers, compared with the 587,180 which had been anticipated at this time. Wholesale value of motor vehicles produced up to July 1 totaled $964 million, compared with a full-schedule total of $3452 million.

While interruptions to the flow of supplies are fewer, they are still troublesome. One company, for example, has bumpers enough for 2300 cars, but batteries for only 44, generators for 799, but starters for only 587, fans for only 152. Shortage of wheels also has been acute, with another company coming within a few minutes of closing its assembly line before a shipment of wheels arrived by truck the other morning.

Comparison of six months' production by General Motors divisions, 1946 against 1941, is particularly striking because of the poor showing made this year, even keeping in mind the fact the corporation was idle for the first three months. It is as follows:

	Six months	
	1946	1941
Chevrolet		
Pas. cars	79,620	613,049
Trucks	78,435	176,595
Pontiac	28,349	187,099
Oldsmobile	22,913	154,443
Buick	27,421	211,589
Cadillac	7,443	40,299
GMC Truck		
Trucks	4,647	49,124
Coaches	379	1,039
GM Canada	13,783	61,971
Total	263,290	1,495,208

The Tucker torpedo, much publicized venture of Preston Tucker and Chicago financial interests in the passenger car field, has taken a new lease on life with announcement by War Assets Administration the group had been given a five-year lease on the $170 million Dodge Chicago engine plant operated during the war by Chrysler Corp. The lease calls for rental of $600,000 the first year, $800,000 the second, and $2.4 million annually thereafter, with option to buy at $30 million. This is somewhat more than Kaiser-Frazer is paying for rental of Willow Run.

Clearing of the vast new plant of its inventory of machine tools and equipment, said to number over 15,000 is expected to be completed by September, according to Tucker, and the first production of his new car to be under way by year-end—a highly optimistic estimate. Principal reconversion problem will include installation of a new overhead conveyor system in the main, and largest, machining and manufacturing building, which alone covers 94 acres. Word is that the aluminum foundry, forge shop and heat treating building will be utilized immediately, and the magnesium foundry changed over to gray iron castings source. An estimated $10 million will be required for the itial conversion, and the operators ar aiming at daily production of 1500 and employment of 25,000.

Following the dispersal of his original production and sales associates—R. R. Rausch, E. L. Reason and J. D. Burke—Tucker has acquired a new team, including Ames E. Brown, vice president, formerly associated with GM of Canada, Fred Rockelman, vice president and sales director, at one time active with Ford and then Plymouth, later a liaison executive in Detroit for Douglas Aircraft, Robert Pierce, vice president and treasurer, one time with Briggs Mfg. Co., and Robert Jack, chief engineer, formerly associated with Oldsmobile.

The car which Tucker says he will build is powered by a 6-cylinder horizontal-opposed 150-horsepower engine mounted in the rear and driving each of the four wheels hydraulically. Reputedly the engine can be idled down to 100 rpm, which is a nice trick if you can do it. Proposed body is of aluminum on tubular steel frame, and overall car weight around 2000 lb. Top speed 130 mph, brakes air-cooled disk type, price $1000-$1300, three headlights, one centrally located and the other two turning with the front wheels and fenders.

Chicago reports said the promoter was considering raising some preliminary financing by advances from dealers who would sell the car, loans being liquidated as fast as cars were delivered. He was said to be reluctant to do any public financing by stock issue until some cars had been produced, and claimed to have 60,000 applications for dealer franchises.

Henry Kaiser has let it be known he has purchased exclusive American manufacturing rights for a light-weight front-wheel drive automobile designed by a French engineer, Charles Gregoire. All-aluminum chassis brings weight down to a reported 1000 pounds, and economy is touted as 60 miles per gallon with top speed of 60 mph. It will probably be placed in the book of future prospects at Willow Run, although the buyer of British rights to the same car says he is planning early production in Canada and India. From preliminary descriptions the car probably would be in the Crosley class which, incidentally, is now being assembled at a Marion Ind., plant at a rate of about 15 per day, something like 200 already having been completed.

National Association of Auto Wreckers Inc. has completed a survey of the amount of scrap in wreckers' yards which shows that although the number of hollow shells is 10 per cent greater than in February, 1943, the weight of scrap involved is at the lowest point since 1924 because auto shells have been so completely stripped.

DESIGNING FOR DIE CASTING

SEND FOR YOUR COPY

TOLERANCES

In designing die castings, *never specify tolerances closer than are essential to meet requirements* since it may cost much more to hold close dimensions than to allow them to come within somewhat wider limits.

Where close tolerances *are* essential, however, the die casting process is capable of doing a quite remarkable job. An outstanding example is the above *zinc alloy* die casting used in communications equipment. The tolerances shown on the drawing are all *as-cast*—and all critical holes are cored to tapping size! Each casting is checked in the special fixture illustrated to make certain that all dimensions are within the limits specified.

For *zinc alloy* die castings, the *minimum* tolerance—*as-cast*—is usually ± .001" *per inch* where the dimension is within solid parts of the die not having relative motion. Where the dimension is across a parting, or between parts of the casting formed by movable cores or slides, wider limits should be specified or provision for machining must be made.

Additional data on tolerances and other design considerations will be found in our booklet "Designing For Die Casting." To insure that you will get the most from your die casting dollar, ask us—or your die casting source—for a free copy of this booklet.

ZINC

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Sharp Boost in Diesel Engine Demand Is Seen

Four basic reasons advanced for bright prospects. Utilization during coal strike demonstrates "standby" possibilities

DEMAND for diesel engines in the immediate future will far exceed the demand felt before the war, according to Harvey T. Hill, executive director, Diesel Engine Manufacturers Association, addressing 39 college and university instructors in mechanical engineering at State College, Pa.

Four basic reasons have stimulated the market for diesel power, Mr. Hill said.

"First, today's engines are better than those built before the war.

"Second, where diesel engines 20 years ago were used almost exclusively for stationary and marine purposes, they are being built today for practically every type of application that calls for constant power."

A third consideration is the fact that the government purchased an enormous quantity of diesel engines to be used in the war effort, then assigned thousands of service men to operate them—men who have returned to the business world well informed as to the diesel's operating efficiency and economy.

A fourth stimulus to demand for diesel power was the coal strike.

"It created a demand for millions of dollars worth of diesel engines for driving generator sets of all sizes," he explained.

"Many power users have told me in the past two months that a coal strike will never catch them off balance again, because they are going to install their own diesel generating plant. Some plants are being put in as 'standbys,' but many others will produce power that has heretofore been furnished by coal."

Mr. Hill also pointed out that during the coal strike, railroads whose locomotive equipment was dominantly diesel were able to maintain full service.

Colorado Fuel & Iron Picks Luria Firm as Scrap Broker

Appointment of Luria Bros. & Co. Inc., Reading, Pa., as scrap broker for Colorado Fuel & Iron Corp., Denver, has been announced by the latter company. The Luria company has opened an office at Pueblo, Colo., to service the account.

TACK MANUFACTURERS: Officers of the American Institute of Tack Manufacturers photographed on the terrace of the Oyster Harbors Club on Cape Cod, Mass., during the group's annual meeting. Left to right, seated: T. S. Fogarty, vice president, Plymouth, Mass.; W. J. Hill, president, Cleveland; C. E. Ames, Plymouth, Mass. Standing is R. A. Stevens, secretary, West Newton, Mass.

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Allegheny Ludlum Steel Corp. has moved its executive offices back to the Oliver Bldg., Pittsburgh, from Brackenridge, Pa., where they were located during the war.

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American Central Mfg. Corp., Connersville, Ind., has completed construction of its porcelain enameling plant in that city.

—o—

Heil Co., Milwaukee, has begun construction of a $225,000 building at Hillsdale, N. J.

—o—

Linde Air Products Co., New York, has expanded its oxygen and acetylene producing and warehouse facilities at Amarillo, Tex.

—o—

Castalloy Co. Inc., Cambridge, Mass., has put into operation a new foundry specifically built for making aluminum and magnesium permanent mold castings. The foundry is located at 363 Third St., Cambridge.

—o—

Pennsylvania Salt Mfg. Co. of Washington, Tacoma, Wash., has started construction of a $1 million chemical plant near Portland, Oreg. The plant will produce liquid chlorine, liquid caustic soda, sodium chlorate, potassium chlorate and sodium hypochlorite.

—o—

Manufacturers Screw Products, Chicago, has changed its name to Stronghold Screw Products Inc.

—o—

National Iron Works, San Diego, Calif., has moved its plant from Seventh Ave. to Harbor Drive and 28th St.

—o—

John R. Cassell Co. Inc. New York, has been appointed exclusive manufacturer's distributor for the line of mechanical drawing accessories made by Instrumaster Industries Inc., Greenwich, Conn.

—o—

Carboloy Co. Inc., Detroit, has appointed Briggs-Weaver Machinery Co., Dallas, Tex., as a distributor for cemented carbide tipped tools.

—o—

Sperry Corp., New York, has acquired the assets of E. G. Straude Mfg. Co., St. Paul, manufacturer of automatic machinery for producing paper boxes and envelopes. Vickers Inc., Detroit, a sub-

sidiary of Sperry, has acquired Tulsa Winch Mfg. Corp., Tulsa, Okla., and will operate it as a division.

—o—

Amplex Division, Chrysler Corp., Detroit, has begun a national drive to standardize sleeve bearing sizes.

—o—

Hill-Chase & Co. Inc., Philadelphia, steel distributor, has begun erection of a warehouse building on Erdman Ave., Baltimore.

—o—

Rheem Research Products Inc., Baltimore, has moved its manufacturing and sales operations to 4004 East Monument St., Baltimore 5. The research laboratories will remain at 1209 East 25th St., Baltimore 18.

—o—

Metal Products Division, Ryan Aeronautical Co., San Diego, Calif., has been awarded the contract for collector rings and exhaust system accessories for Consolidated-Vultee's "240" airliners. The order is for approximately $200,000.

—o—

Columbia Chemical Division plant, Barberton, O., Pittsburgh Plate Glass Co., expects its production of chemicals to approach capacity by the end of July.

—o—

Benjamin Electric Mfg. Co., Des Plaines, Ill., has opened its new $100,000 product development and testing laboratory as part of the company's 3-year expansion program. The new laboratory embodies many unique advancements in construction, equipment and design.

—o—

DeVilbiss Co., Toledo, O., has reserved three one-week courses, starting July 15, Sept. 16, and Nov. 4, in its School of Spray Painting for industrial finishers.

—o—

Southern States Iron Roofing Co., Savannah, Ga., has started production of aluminum shingles at its newly enlarged Birmingham plant.

—o—

Franklin Railway Supply Co. Inc. has appointed the Baldwin Locomotive Works' export department, Philadelphia, foreign sales representative.

—o—

Detrex Corp., Detroit, has moved its administrative staff and plant headquarters to 14331 Woodrow Wilson Ave., Detroit. Mail address is Box 501, Roosevelt Park Annex, Detroit 32.

—o—

Bell & Gossett Co., Morton Grove, Ill., has completed arrangements for the production of electric motors for use on its own equipment.

—o—

Atlas Lumnite Cement Co., New York, has been merged with Universal Atlas Cement Co., New York, and will be known as Lumnite Division, Universal Atlas Cement Co. Both companies are wholly owned subsidiaries of United States Steel Corp.

New Die Company Formed By Lester and Aetna Firms

Lester-Aetna Die Co., Warren, O., was recently formed when the Tool & Die Division of Lester Engineering Co., Cleveland, was reorganized and moved from Cleveland to Warren. The new company is jointly owned by the Lester company and Aetna-Standard Engineering Co., Warren.

Officers of the new company are: Nathan Lester, president; H. Gerald Coffey and D. White, vice presidents; and Lloyd L. Dalbey, secretary-treasurer.

Distributors Represented In Pressed Steel Decisions

Pressed Steel Car Co., Pittsburgh, has inaugurated a system of manufacturer-distributor relations which had its try-out last week in Chicago. Under the plan a distributors' committee consisting of one elected distributor from each area of the country is given the authority to speak for all the distributors and is given a voice in company decisions regarding sales quotas, dealer promotion, sales education, product design and advertising strategy. Members of the nine-man committee are elected for one year and cannot succeed themselves until each distributor has served a term.

Plans are now under way to extend the idea to include retailers who will function with distributors in much the same manner.

BUYING STEEL PLANT: Ownership of the Portsmouth, O., steel works passed from Wheeling Steel Corp. to the new Portsmouth Steel Corp. as Elmer Schwartz, president of the new concern, makes out a check for $12 million and gives it to L. W. Franzheim, left, vice president and treasurer of Wheeling Steel

Industrial Rayon Leases Cleveland Plant, Expands

Plans for expansion of the manufacturing and research activities of Industrial Rayon Corp., Cleveland, have been disclosed with announcement the company has arranged to lease for five years 43,000 square feet of floor space in the former Cleveland Graphite Bronze plant at 880 East 72nd St., Cleveland.

Industrial Rayon's Machinery Division, which will occupy this space, will use the plant to manufacture spindles, thread-advancing reels and other parts for continuous process spinning machines which the company is building for export, in addition to machinery for the company's own plants.

In addition to these manufacturing operations, mechanical research and development work will be carried on at new location.

To Build "Tool a Minute" At Independent Pneumatic

Production of "a tool a minute" and the largest peacetime output in the company's history is expected in the near future by Independent Pneumatic Tool Co., Chicago, E. N. Haas, works manager of the company's Aurora, Ill., factory, has revealed.

"Work orders entered shortly after V-J Day for mass production of all models are now suddenly converging on assembly lines," Mr. Haas explained. Universal electric tools dominate the company's present production, but many postwar orders for the heavier type high frequency electric and pneumatic tools are also being completed now.

Output of Coolers Being Raised at Westinghouse

Electrically operated milk coolers are rolling off Westinghouse assembly lines in Springfield, Mass., in a volume four times as great as the prewar production rate, and average weekly output of drinking water coolers has doubled compared with prewar figures, according to H. F. Hildreth, manager, refrigeration specialties department, Westinghouse Electric Appliance Division. He predicted that by fall, production will be raised to a rate 12 times that of the prewar period.

Unemployment Compensation Plan Held Inefficient in California

Manufacturers' association launches campaign to eliminate abuse of system. USES said to be encouraging unemployment by payments to thousands not entitled to relief. Employment in state reported near wartime peak

SAN FRANCISCO

THE California Manufacturers Association has started a campaign to halt what it says is "inefficiency of the U. S. Employment Service" and the "abuse of unemployment compensation."

Following a "careful analysis" of what the association calls the "alleged unemployment situation" in California, the manufacturers group charges that:

"1. Unemployment compensation is being paid to thousands upon thousands, beyond those for whom it is intended and who properly deserve it, with the result that the taxpayers are unnecessarily burdened.

"2. USES inefficiency has contributed to, and in effect has encouraged, unemployment.

"3. The California Unemployment Compensation Act has been abused with the direct effect of encouraging both unemployment and the payment of compensation to persons for whom it was neither intended or necessary.

"4. The fund has been operated at a deficit for the greater part of this year unnecessarily.

"5. Unemployment compensation payments have become such a petty 'racket' as to degrade the dignified purpose for which they were intended.

"6. Veterans are not the great malcffenders, as USES has callously been prone to imply. The lazy thousands are predominantly non-veterans who, through connivance between USES and themselves, manage to evade suitable job opportunities."

The association also claims that the unemployment compensation law has been misinterpreted so that there has been fostered an attitude that the compensation fund is a bank deposit payable on demand. It is pointed out that, on the contrary, the fund is insurance to be available when needed to lessen hardships to involuntarily unemployed; to stabilize purchasing power and halt spread of unemployment; to assist employers and workers; and to minimize relief and charity.

The association also points out that per capita cost of California state taxes (excluding federal and local taxes) is nearly double cost of state taxes in other industrial states. As a result, the group says, California - manufactured products are placed at a price-competition disadvantage. The result is that volume of sales, and thus payrolls, are unable to reach full possibilities. It also is charged that "take-home" pay of employees is thus affected.

"If California products cannot compete in price they will not be bought," says the association. "Yet, if we are to support the continuously increasing population and use the war-expanded factory capacity here we must increase sales greatly and thus increase the volume of production and payrolls."

Meanwhile, a report of the State Reconstruction & Re-employment Commission, just released, says that employment in California is nearing its wartime peak, which was reached in the summer and fall of 1943. The report says that agricultural employment this summer is expected to exceed that of 1943.

The report also forecasts August, 1946, non-agricultural employment at between 2,953,000 and 3,056,000 which would compare with the 1943 wartime high of 3,165,000. This is 366,000 above the February, 1946, low.

The commission says construction employment is expected to remain about the same in July and August, with a possible small increase. This will depend chiefly on material and equipment availability.

The report indicates that the number of unemployed has continued to decline in California from the postwar peak, reached at the end of March, 1946. Estimated unemployment at the end of May dropped about 40,000 below April and about 65,000 below March. There was a further decline in June.

U. S. Steel's Purchase of Geneva Seen Boon to West

SEATTLE

Clyde Summerville, Seattle Steel Co., and chairman of the subcommittee on steel, Seattle Chamber of Commerce industrial committee, has issued a statement in which he points out that the purchase of the Geneva plant by Columbia Steel Corp. gives the green light to many new West Coast industries. In the past such plants have been hampered by lack of sufficient steel priced to a western economy.

"The West has a big stake in this project," Mr. Summerville added, "for many primary industries are steel and iron consumers. With Geneva's capacity of 1,150,000 net tons of pig and 1,283,400 tons of ingot, western industry can now plan ahead with some assurance that steel will be available near at hand. With United States Steel's 'know-how' it is a blessing the plant falls into its hands and it is quite possible that the company can begin to roll plate within 60 days. Our committee has urgently insisted that whoever obtained the Geneva plant should plan on establishing Geneva as a price basing point, and that the rail carriers establish new rates to western points more in line with our western economy."

Negotiations have been concluded between Todd Seattle Dry Docks and the Navy whereby the former takes over the Navy yard in Seattle, to be used as a repair plant, in exchange for the Todd Plant at Tacoma to be converted into an inactive Navy base. During the war Todd operated both yards in which the government has a $20 million investment.

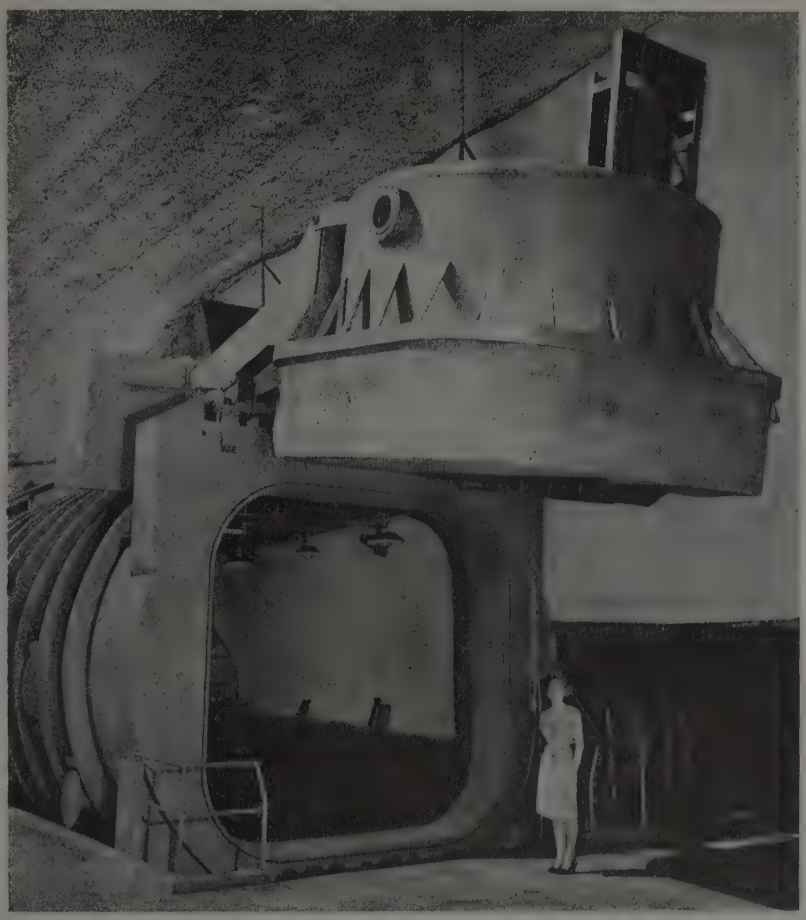
Manpower Seen Key To Rapid Expansion of Production at U. S. Steel's Geneva Works

DEPENDING largely on success in recruiting manpower, operations of the Geneva Steel plant in Utah, recently purchased from the government by United States Steel Corp., are expected to be stepped up sharply in the next six weeks.

C. L. Waggoner, who has been named general superintendent of Geneva, announced that two blast furnaces, two batteries of coke ovens, three open hearths and the slab and plate mill will be in operation within six weeks.

Mr. Waggoner stated that he was optimistic that some of the orders for 400,000 tons of plate now on the market may be available to Geneva. Should the Geneva plant get a good proportion of these orders, he said, it would mean production at full capacity for some months. The full yearly capacity of the plate mill is 700,000 tons.

Mr. Waggoner pointed out that present forecasts are subject to change either way. "A steel plant cannot stand still," he said. "It either grows or it deteriorates, and I think Geneva will grow."



Largest of its kind in the aircraft industry is this altitude testing chamber built at North American Aviation plant at Los Angeles. The chamber weighs 21 tons and can simulate temperature and pressure conditions of up to 60,000 feet

Aircraft Production in Los Angeles Area Reported Holding Well Above Prewar Level

LOS ANGELES

HIGHLIGHT of a preliminary report on southern California aviation production released last week was a description of the 75-ton steel laboratory at North American Aviation, where "tomorrow's planes are being tested today."

This is a new refrigerated altitude chamber—largest in the aircraft industry—and within its reinforced walls engineers create polar temperatures and stratosphere altitudes.

For with aircraft speeds and ceilings pushing always upward, technicians must know in advance how designs and materials will react in air densities from sea level to 60,000 feet and at temperatures ranging from 100 degrees below zero to 200 degrees above.

At a touch of the controls the huge stainless steel cylinder can be almost completely exhausted of air. Fog, rain, ice, snow or sleet can be made to swirl inside the 15½-foot cork-lined diameter of the chamber. Rates of climb can be varied up to 7500 feet per minute and dives measured at rates up to 20,000 feet per minute to study aerodynamic effects on whole fighter ships or components of larger ships, on instruments, hydraulic equipment, cabin heating and ventilating systems and other accessories.

While aircraft sales of planes produced in the Los Angeles area are sharply under last year's record, total production is still well above prewar levels.

Highest showings are being made by companies which have continuing large orders and are also in position to step up production of commercial transports rapidly, or which are engaged in conversion of military transports for airline use. Some smaller concerns with large private plane orders also are doing well.

Qualified observers believe that business will grow swiftly once Congress adopts recommendations of the Air Coordinating Committee for the formulation of a national aviation policy.

The program advocated is contained in proposed legislation to supplant the obsolete Air Corps Act of 1926, and favors maintenance of a strong manufacturing industry capable of sudden expansion. Plans for the purchase of 3000 to 5780 military planes a year are included in the program.

Specifically, Lockheed and Douglas are perhaps the best situated in point of future deliveries. The former is completing a sizable number of Constellations, adapted from the wartime C-69 design, while production of the older Douglas DC-3 and DC-4 models was resumed with little delay.

Principal restrictive factors are the material shortages.

Small Industries Seeking Space in Los Angeles Area

It is to smaller industrial plants as much as to large ones that Los Angeles pins its hopes for a bright business future and, granting this, the future is bright.

James F. Bone, manager, Chamber of Commerce, Industrial Department, said last week that his office has on hand requests for 1,000,000 square feet of industrial space for small plants. Mr. Bone accompanied his disclosure with an appeal to owners of such space to contact the chamber.

The demand for sites for large plants also continues strong, said Mr. Bone, the industrial department having on file requests for a total of 1,750,000 square feet for such factories.

He defined small plants as those employing 100 or fewer people.

Workmen Refuse To Load Steel in Make-Work Move

The *S. S. Mahimahi*, a Matson Navigation Co. steamer, sailed from Los Angeles Harbor last week minus part of its scheduled cargo in the form of 107 tons of steel after longshoremen there refused to load the steel from cargo trucks.

According to officials of the Waterfront Employers Association, the longshoremen demanded that the steel be placed flat on the piers before being loaded on the ship. This, it was asserted, was a "make-work" move since it has been the practice for years to load direct from cargo trucks.

The steel on the dock is needed sorely at Hawaii to repair port facilities.

MEN of industry

J. R. Fagan has been appointed senior vice president, Foote Bros. Gear & Machine Corp., Chicago. He had been secretary and treasurer of the corporation, and will continue as treasurer. **Arthur W. Coppin** will succeed Mr. Fagan as secretary. Mr. Coppin was counsel and manager of industrial relations for the company. In assuming the duties of secretary, he also becomes the chief executive in charge of industrial relations for the firm. He joined Foote Bros. in 1943. **Fred Salzman** has been appointed assistant vice president of the corporation. He has been with the firm for more than 20 years.

—o—

Ralph E. Sperry, controller, Ducommun Metals & Supply Co., Los Angeles, and **Gilman C. Harvey**, controller, Hawkridge Bros. Co., Boston, have been elected to membership in the Controllers Institute of America, New York.

—o—

Joseph N. Peters has been named manager of the Carbide & Cast Alloy Division, Jessop Steel Co., Washington, Pa. He will supervise the production and sale of tools, dies, and wear resistant parts made from sintered and hot pressed carbides and cast nonferrous alloys. Mr. Peters joined the company in September, 1945.

—o—

Dr. James T. Eaton has been named manager of research, in charge of the company's laboratories and product development, E. F. Houghton & Co., Philadelphia. Dr. Eaton, formerly research assistant to the vice president, has been with the company since 1937. **Henry H. High** has been named superintendent of the Philadelphia oil department of the firm, succeeding **D. M. Harvey**, resigned. Mr. High was superintendent of laboratories, and has been with Houghton since 1930.

—o—

J. Elmer Housley, district power manager, Aluminum Co. of America, Pittsburgh, has been elected president of American Institute of Electrical Engineers, New York, for the year beginning Aug. 1, 1946. The following vice presidents were elected by the institute: **E. W. Davis**, Cambridge, Mass.; **O. E. Buckley**, New York; **T G. LeClair**, Chicago; **R. F. Danner**, Oklahoma City, Okla.; **C. F. Terrell**, Seattle, Wash. **W. I. Slichter**, Schenectady, N. Y., has been re-elected treasurer.

—o—

Emerson H. Todd has been appointed sales manager, American Cable and Hazard Wire Rope Divisions, American Chain & Cable Co. Inc., Bridgeport, Conn., succeeding **Frank W. Bemis** who has resigned to enter another type of business in Omaha, Neb. Mr. Todd will have headquarters at Wilkes-Barre, Pa. He has been with the company since 1925, and for the last several years had been Chicago district sales manager for the American Cable and Hazard Wire Rope Divisions.

—o—

John W. Porter, for 11 years president, Alabama By-Products Corp., Birmingham, has retired. He has been succeeded by Phil H. Neal, formerly assistant to the president of the corporation. Mr. Porter became a director of the organization in 1932, and its president in 1935. Mr. Neal has been associated with Alabama By-Products Corp. since its formation in 1920. He became vice president in April, 1945, and was promoted to assistant to the president in September of that year.

—o—

Henry Strobel Jr. has been appointed Cincinnati district representative, Hammond Iron Works, Warren, Pa.

—o—

Herbert L. Mac Elroy has been appointed New England representative, Geo. P. Reintjes Co., Kansas City, Mo. He will have offices in Boston.

—o—

Kenneth H. Hobbie, Chicago district manager, Driver-Harris Co., Harrison, N. J., has been elected president of the Chicago Technical Societies Council for 1946-47. He is one of the founders of the council, organized three years ago.

—o—

John G. Miller has been named mechanical engineer, Gilbert Associates Inc., Reading, Pa. Mr. Miller has been recently released from the Navy.

—o—

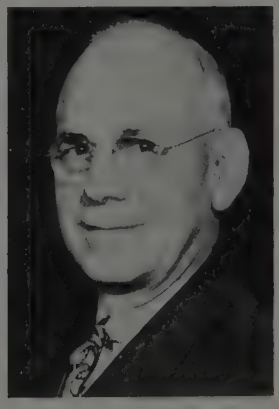
George A. Lennox has been appointed vice president in charge of sales, Driver-Harris Co., Harrison, N. J. **Joseph B. Shelby** has been named assistant vice president in the same department. Mr. Lennox has been with the company since 1907. He became general sales manager in 1942. Mr. Shelby joined the firm in 1919, and had been assistant general sales manager since 1942.

—o—

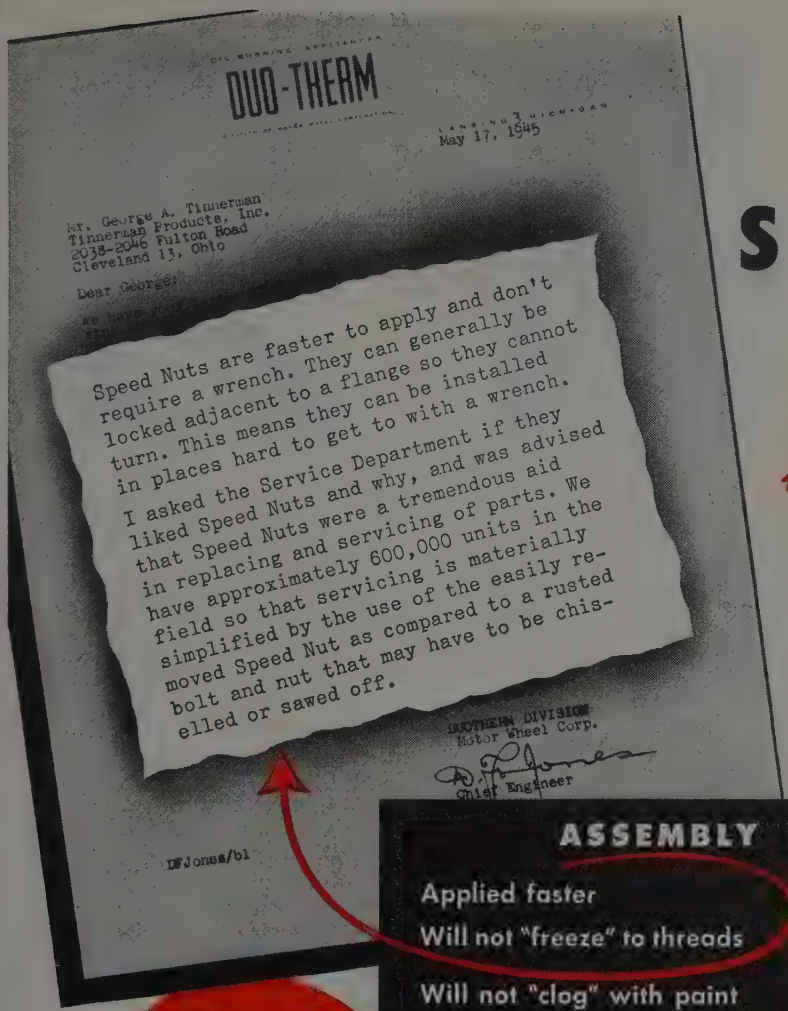
Dr. H. Jermain Creighton, head of the chemistry department, Swarthmore College, has been awarded the Edward Goodrich Acheson Gold Medal and thousand dollar prize of the Electrochemical Society Inc., Columbia Uni-

JOSEPH N. PETERS

EMERSON H. TODD



GEORGE A. LENNOX



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FASTEST THING IN FASTENINGS

HAROLD J. RUTTENBERG

GLENN A. HUTT

MILAN J. SIEBERT

versity, New York, for his outstanding accomplishments on electrochemistry. Presentation of the medal is scheduled for Oct. 17, at Toronto, Ont., in conjunction with the 90th congress of the Electrochemical Society. Dr. Creighton served as president of the society in 1939-40.

—o—

Harold J. Ruttenberg has been appointed vice president, Portsmouth Steel Corp., Portsmouth, O. Mr. Ruttenberg has been research director of the United Steelworkers of America (CIO) since that organization's inception in 1936. During the war, he served as assistant director of the War Production Board's Steel Division. He was also a member of the Steel Commission of the War Labor Board. Prior to his association with the CIO steelworkers union, Mr. Ruttenberg was special investigator for the United States Senate's Munitions Committee and research assistant for a Brookings Institute study of the iron and steel industry.

—o—

Dr. Bennett F. Ellefson has been appointed director of the central engineering laboratories, Sylvania Electric Products Inc., Ipswich, Mass. He had been assistant to the vice president in charge of engineering, and has been active in pure and applied research for the company since 1937.

—o—

J. B. Trotman has been appointed head of the new Industrial Pump Division, Bowser Inc., Ft. Wayne, Ind. Mr. Trotman had been general sales manager, Blackmer Pump Co., Grand Rapids, Mich.

—o—

J. W. Weingartner has been appointed production control manager, Brown Instrument Co., Philadelphia. Mr. Weingartner has been with this industrial division of Minneapolis-Honeywell Regulator Co., Minneapolis, for the last 22 years. He will also direct purchasing. **Charles Goodman** has assumed the duties of purchasing agent under Mr. Weingartner's supervision. **William Lawson** has been named assistant production control manager.

—o—

Glenn A. Hutt has been promoted to general sales manager, Ferro Enamel Corp., Cleveland, and its divisions. Mr. Hutt, recently released from the Army, originally joined the corporation in 1935. Several months later he became director for Ferro Enamels, Pty., Sidney, the company's Australian subsidiary. He returned to the United States in 1940, and in 1941 was appointed assistant general sales manager of the Ferro corporation and its divisions. **John R. Kauffman,** recently released from the Navy, has been named eastern sales manager of the corporation's Allied Engineering Division. He will have offices in New York. Mr. Kauffman joined the division in 1940 as eastern representative.

—o—

Ray Ade has been appointed traffic appliance sales manager, Graybar Electric Co., New York. Mr. Ade joined the company's merchandising department in 1936 in Atlanta. In 1938, he was moved to Jacksonville, Fla., and has remained there until now, having served for the last two years as peninsular district merchandising manager.

—o—

B. E. Kibbee, executive vice president and treasurer, Sharon Steel Corp., Sharon, Pa., has been presented a gold watch, on completing 40 years service with the company, by **Henry A. Roemer,** president. Mr. Kibbee became executive vice president of the Sharon corporation in 1933, and was elected treasurer in 1943.

—o—

Dr. Clyde Williams, director, Battelle Memorial Institute, Columbus, O., was presented the honorary degree of Doctor of Science at recent convocation ceremonies of the University of Utah, Salt Lake City, Utah. The degree was presented by **Dr. A. R. Olpin,** president of the university, who cited Dr. Williams' accomplishments in research administration and in directing the activities of the War Metallurgy Committee of the National Academy of Sciences and the National Research Council.

—o—

Milan J. Siebert has been promoted to vice president, and **Kenneth J. Humberstone** to chief engineer and chief metallurgist in charge of Amera-Mag metallurgy and engineering, American Tank & Fabricating Co., Cleveland. Mr. Siebert, who will also serve on the board of directors, has been with the company since May 1. Mr. Humberstone joined the firm Jan. 1.

—o—

Joseph Monahan, Grand Rapids, Mich., has been appointed franchised dealer for the western part of Michigan for Denison Engineering Co., Columbus, O. His territory will also include the northwestern portion of Michigan.

—o—

David L. James Jr. has been appointed industrial engineer, High Bridge, N. J., and Easton, Pa., plants, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., reporting to the works manager, **L. E. MacFadyen.** During the last five years he was industrial engineer, Atha Works, Crucible Steel Co. of America, New York.

—o—

Clifford M. Manzer has been appointed chief engineer, Progressive Welder Co., Detroit. He will be in charge of all engineering activities of the company. He had been with the General Electric Co., Schenectady, N. Y., for 22 years, the last eleven of which had been spent at the company's Lynn, Mass., plant, in charge of research, development and manufacturing processes on resistance welding. **Walter L. Jewett,** who had been chief

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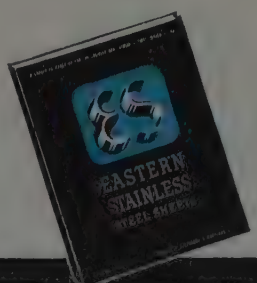

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ES

DR. A. ALLEN BATES

engineer for Progressive for the last nine months, has been appointed manager of development engineering, reporting directly to **Fred H. Johnson,** president of Progressive Welder Co. Mr. Jewett has been with the company for the last 10 years.

—o—

Dr. A. Allen Bates has been elected to the newly created post of vice president for research and development, **Portland** Cement Association, Chicago. Since 1938 he has been manager of the Chemical, Metallurgical & Ceramic Research Division, Westinghouse Electric Corp., Pittsburgh. For ten years prior to his association with Westinghouse, Dr. Bates was professor of metallurgical engineering, Case School of Applied Science, **Cleveland.**

—o—

Richard P. Seelig has joined the staff of American Electro Metal Corp., Yonkers, N. Y. He will be principally concerned with engineering and tooling for production work, and engineering developments on new processes. Mr. Seelig was with Powder Metallurgy Corp., Long Island City, N. Y., for eight and a half years.

—o—

A. A. Rorison has been appointed to be general auditor of Douglas Aircraft Co., Santa Monica, Calif. Mr. Rorison, who had been chief contract auditor, joined the company in 1943.

—o—

J. D. Hamacher has been appointed plant engineer, Detrex Corp., Detroit. He joined the corporation in 1944, and was a design engineer in the oil extraction division. His new duties include plant layout and supervision of maintenance of all Detrex properties and buildings.

—o—

Dr. F. D. Richardson has been appointed head of the chemistry department, British Iron & Steel Research Association, London. From 1942 to 1946, he was deputy director of miscellaneous weapon development at the British Admiralty, where he assisted in the development of new weapons for the Royal Navy.

—o—

Herbert A. Davies has been named vice president and general manager, Virginia Bridge Co., Roanoke, Va., a subsidiary of United States Steel Corp., New York. He had been manager of the Birmingham plant of the Virginia Bridge Co. since 1926, and will be succeeded in this capacity by **Harold W. Morgan.** Mr. Morgan joined the company's predecessor, Virginia Bridge & Iron Co., in 1923 in the engineering department at Roanoke.

—o—

William E. Knox has been elected president and general manager, Westinghouse Electric International Co., New York, succeeding **John W. White** who has resigned to become director general of Industria Electrica de Mexico. Mr. Knox had been vice president of the International company since March, 1944, and before that was assistant general manager of the company since 1937. He was made a director of the company in 1940. He has been with the organization 24 years. Mr. White was elected president of the International company in April, 1944. He joined the parent Westinghouse company at its Pittsburgh headquarters 41 years ago, becoming affiliated with the Westinghouse Electric International Co. in 1918. **E. W. Gaughan** has been appointed assistant manager, Westinghouse Electric Supply Co., New York. Mr. Gaughan had been appliance manager in the company's west central district, with headquarters at Columbus, O. He joined Westinghouse Electric Corp. at East Pittsburgh in 1919. **Tomlinson Fort,** manager, central station department, has been presented the Order of Merit, highest honor conferred upon its employees by the Westinghouse Electric Corp., for distinguished service to the electrical industry. He joined the corporation in 1923, and has held his present position since 1943. **Richard J. Sargent** has been named merchandise manager, laundry equipment department, Westinghouse Electric Equipment Division, Mansfield, O. He has been with the corporation since 1936.

—o—

William C. Scheutzow has been appointed a representative in the Cleveland area, Lamson & Sessions Co., Cleveland. He has been with the company since 1923.

—o—

W. D. Bickel has been named manager, power department, Machinery Division, Dravo Corp., Pittsburgh. He joined the corporation in 1936, and prior to his new appointment had been project engineer for the power department. **T. L. Hartman** has been named manager of the piping department of the company's machinery division. He had been associated with the power department of the organization since 1937. **W. G. Greer** has been appointed assistant labor relations manager for the corporation. Mr. Greer joined Dravo in 1932.

—o—

Robert C. Wayne, recently released from the Navy, has been appointed assistant to the technical and research director, Steel Founders' Society of America, Cleveland.

—o—

C. J. Duby has been appointed general superintendent in charge of all flat rolling in the Warren district, Republic Steel Corp., Cleveland. He had been

DAVID M. KLAUSMEYER

Who has been appointed president, Marmon-Herrington Co. Inc., Indianapolis, noted in STEEL, July 1 issue, p. 90.

CARL E. BOLTE

Appointed executive secretary, National Lubricating Grease Institute, Kansas City, Mo., STEEL, July 1 issue, p. 92.

MARSHALL M. SMITH

Who has been elected vice president and director, E. W. Bliss Co., Brooklyn, N. Y., STEEL, July 8 issue, p. 88.

CARL W. COSLOW

Promoted to vice president in charge of manufacturing, Plomb Tool Co., Los Angeles, STEEL, July 8 issue, p. 93.

F. K. McDANEL

Elected president, American Bridge Co., Pittsburgh, and Virginia Bridge Co., Roanoke, Va., STEEL, July 8 issue, p. 93.

chief engineer of the district since 1933. He joined the Republic corporation in 1917. **H. K. Ihrig** succeeds Mr. Duby as chief engineer of the Warren district. Mr. Ihrig, who joined Republic in 1939, was assistant chief engineer of the district.

—o—

C. A. Dwyer has been placed in charge of the sale of industrial and solid tires, B. F. Goodrich Co., Akron. He had recently been serving the company as co-ordinator of federal regulations and on special assignments. Mr. Dwyer served on the staff of the Office of Rubber Director during the early part of the war.

—o—

Harry L. Crawford and **William M. Mazer** have been appointed district representatives for the state of Michigan, Empire Steel Corp., Mansfield, O. They will have headquarters in Detroit.

—o—

R. W. Mason Jr. has joined the Development & Research Division, International Nickel Co., Inc., New York. He will have headquarters at the Detroit technical section of the division, where he will serve as metallurgist and consultant to consumers and producers on the use of nickel in ferrous and nonferrous castings. Mr. Mason was with Lithium Co., Newark, N. J.

—o—

F. F. Simon has been appointed vice president, Wagner Electric Corp., St. Louis. **G. A. Waters** has been named vice president in charge of manufacturing for the company, and **K. M. Coggeshall,** assistant vice president in charge of production and purchasing. Mr. Simon has been with the Wagner corporation since 1917 and has been controller since 1934, which position he will continue to hold along with that of vice president. In January of this year he was elected a director of the corporation. Mr. Waters joined the company in 1909, and subsequently advanced to the position of chief engineer. Mr. Coggeshall joined the Wagner corporation in 1915, and became production manager in 1926.

—o—

J. C. Tweedell, manager, International Division, New York, York Corp., York, Pa., has been elected president of the Export Managers' Club of New York. He will hold office for two years. Mr. Tweedell was appointed manager of the York Corp. export activities in 1935.

—o—

American Pulley Co., Philadelphia, has elected the following officials: **Frank E. Brown,** vice president in charge of sales and advertising; **Caleb F. Fox III,** vice president in charge of production; **W. R. Mitchell,** controller; and **William A. Williams,** chief engineer.

—o—

Russell Gowans, president and director, Western Crown Cork & Seal Co., San Francisco, has been elected a director of Crown Cork & Seal Co. Inc., Baltimore, the parent company.

—o—

N. H. Critton has been named eastern sales manager, Monarch Machine Tool Co., Sidney, O. He will have headquarters in New York. Mr. Critton had been district manager for the company in Newark, N. J. In his new position, he will also supervise an export sales staff now being organized. **F. J. Griffis** of Monarch's eastern sales staff will become district manager in Newark.

—o—

Sidney L. W. Lea, recently released from the Army, has been named manager of advertising, Pennsylvania Salt Mfg. Co., Philadelphia, succeeding **Ethel Serfas Klingman,** who is retiring from business. **Anne Hurlbrink** has been named assistant advertising manager. Before joining the Army in 1940, Mr. Lea was assistant to **George B. Beitzel,** now vice president in charge of sales. Mr. Klingman has been presented with one of the company's ten year service pins by Mr. Beitzel.

—o—

Prof. James R. Cudworth, of the University of Alabama faculty, has assumed his new duties as dean of the College of Engineering. He succeeds **Dr. George J. Davis Jr.,** who has retired to an emeritus status. Dean Cudworth has been a member of the university faculty 20 years.

OBITUARIES . . .

Joseph Eugene Dulaney, 45, and **Virginius W. Moody Jr.,** 38, respectively assistant vice president and assistant manufacturing director, Foil Division, Richmond, Va., Reynolds Metals Co., were killed recently when they were struck by lightning while playing golf in Richmond. Mr. Dulaney had been with the Reynolds company more than 20 years. Mr. Moody had been with the organization for more than 15 years.

—o—

Herman E. Heine, 76, who retired six years ago as plant superintendent, Bradley Wash Fountain Co., Milwaukee, died recently in that city. He had been plant superintendent of the company for 20 years.

—o—

Edward B. Sturgis, 73, retired mining engineer and publisher, died recently at his home in Pleasantville, N. Y. During the first world war, he was assistant secretary of the Mining & Metallurgical Society of America. Mr. Sturgis for several years was editor and publisher of "The Mines Hand Book".

Selecting the RIGHT

When motor adaptation is correct, maximum efficiency can be obtained in any application. Simplest and most reliable type drive—squirrel cage induction motor—can be designed to control duty cycle losses

By J. M. STEIN
Motor Engineering Dept.
And
G. A. CALDWELL
Industry Engineering Dept.
Westinghouse Electric Corp.
Pittsburgh

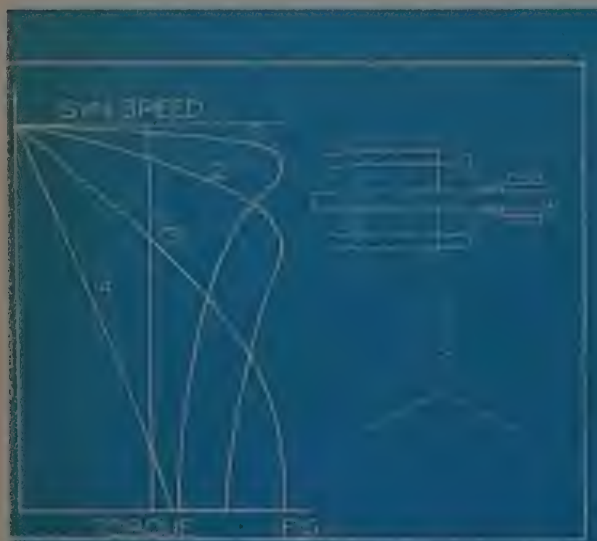
THERE was a time when machinery electrification meant using a single motor to drive a machine instead of taking power from a lineshaft or from some other prime mover. We have now reached the time when machinery electrification means much more. A single motor driving a complete machine is now the exception rather than the rule. On large complicated machines five to ten motors are not uncommon. Machinery electrification in its full sense now means correct application of motors as well as the associated control equipment and other auxiliary electrical devices to give the desired sequence of operation; it means complete cooperation between electrical manufacturer and machinery builder.

It is really surprising what can be done with our simplest and most reliable type drive—the squirrel cage induction motor. While this type drive is essentially a constant speed motor, it must be started and stopped, and in many cases reversed. The conditions in the motor while starting, stopping, and reversing are entirely different from those when it is running at its normal speed, and the combination of these conditions is what is generally called the duty cycle. Once the cycle has been determined, it is possible to determine relative motor losses for various portions of the cycle and also to control these losses by proper motor design to obtain most efficient overall characteristics during operation.

Most common squirrel cage induction motor is the general-purpose motor or NEMA class A having a speed torque characteristic similar to curve 1 of Fig. 1. On the basis of rated torque, starting torque is approximately 150 per cent and the maximum torque approximately 200 per cent. The slip at full load is less than 5 per cent and the locked current is approximately 650 per cent. Relative shape of the curve is shown in Fig. 2. This type motor has high running efficiency and is applicable to continuous loads where the motor is not subject to frequent starts on a system of high inertia.

Squirrel cage winding of the general-purpose induction motor is generally built of copper bars and resistance rings or as a die casting of aluminum. When a torque characteristic such as shown in Fig. 1, curves 2 and 3, is desired, the rotor winding is constructed of brass or bronze or other high resistance alloys, or cast of various aluminum alloys. Characteristics are shown in Fig. 3.

These rotors are used in motors for hoist, shear, and press applications. Types considered standard usually fall into three categories: (1) Punch press motor with 5-8 per cent slip, (2) punch-press motor with 8-13 per cent slip, and (3) hoist motor usually having slips about the same as (2) but with an intermittent time temperature rating using a smaller frame size than the comparable



MOTOR *for the Job*

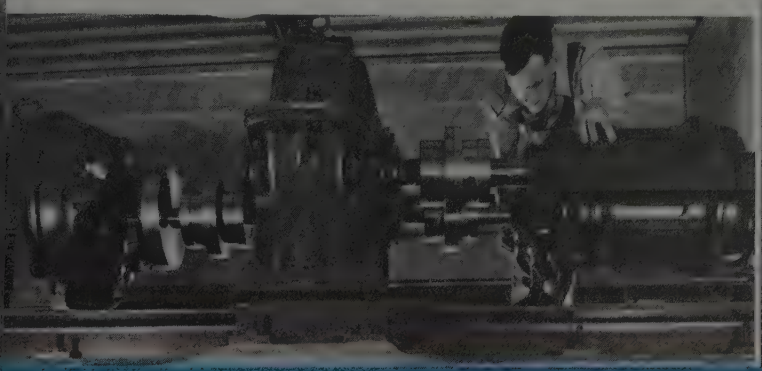
Fig. 1—Speed torque characteristic of general-purpose induction motor with squirrel-cage winding of straight copper bars connected to resistance rings. Curves 1, 2 and 3 are torque characteristics resulting from rotor windings of brass or bronze or other high resistant alloys

Fig. 2—Speed-torque characteristic of general-purpose induction motor

Fig. 3—Speed-torque characteristic of general-purpose induction motor with special rotor for punch press or hoist operation

Fig. 4—Speed-torque characteristic of class 2 induction motor with double-deck rotor

Fig. 5 and 6—Excess thermal capacity is provided in this Westinghouse induction motor, left, to keep temperature rise within acceptable limits during acceleration of a high inertia fan load such as is shown on right



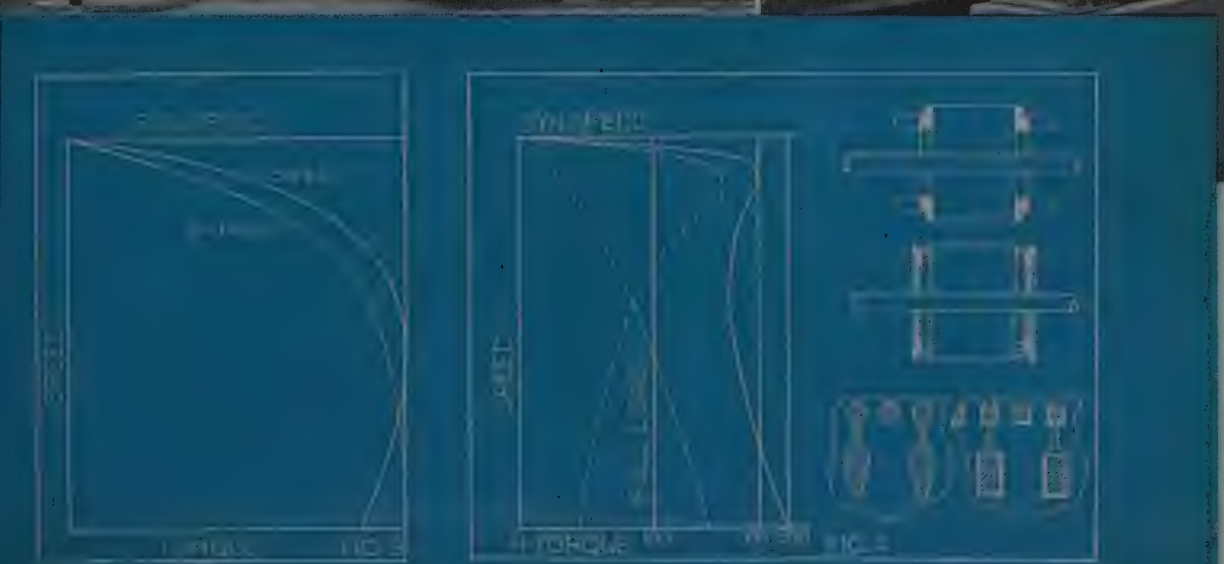


Fig. 7—Typical locomotive coaling station with two-bucket skip. Power is supplied by a two-speed squirrel-cage induction motor

general-purpose motor of the same horsepower rating. These motors are included in NEMA class D.

Some motors are developed especially for low starting current requirements; they must rely on means other than secondary resistance to obtain high torque per unit current. Most popular motor in this class is the class I motor (NEMA class B) which uses a rotor construction incorporating deeper bars than the general-purpose motor. Increased depth of bar causes current to crowd toward the top, this crowding increasing with rotor frequency. Since the rotor frequency is higher under locked conditions than under running conditions the apparent resistance of the rotor is higher, resulting in increased starting torque per unit current.

Crowding of current to the top of the bar may become more effective if top of bar has a higher resistance, and may be increased further by allowing a flux leakage path between the upper and lower parts. This is exactly what is done in the class 2 motor (NEMA class C) which is built with a double-deck rotor. The characteristics of this motor are shown in Fig. 4. Top bar and ring are generally of smaller cross section and higher resistivity than the lower bar and ring.

Class 2 motor has a 200 per cent starting torque, 180 per cent pull-out torque, and starting currents of the same magnitude as the class 1 motor. With reduced voltage starting it is possible to obtain a further reduction in starting current without risking low torque. It should be remembered that the class 2 motor was designed primarily as a means of obtaining low starting currents, and not as a motor for high-torque applications.

When an induction motor is connected to a load of high moment of inertia, and with frequent starting and stopping, heat is generated in the various members as the motor changes speed. Rate of acceleration of load is proportional to available torque of motor and inversely proportional to moment of inertia of the system. This results in a time of acceleration which is shorter, the higher the available torque. Power dissipated in the rotor is higher for the higher resistance. Since total heating in the rotor is a product of time of acceleration and average loss in the rotor, rotor heating is independent of rotor resistance. Actually it is equal to the total energy absorbed in the accelerated mass; indicating overall efficiency of rotor of 50 per cent during acceleration.

Double-deck motor may be considered without much error to be equivalent to two separate motors. Top part will be equivalent to a rotor with torque characteristics shown on curve 3 Fig. 1, while the bottom part will have characteristics as shown on curve 1 of Fig. 1. When two motors are connected to the same ineritia load it is necessary that the total rotor heating be the same as if one motor is connected to the same load. Division of heating between two rotors, however, will be proportional to their respective contributions to the torque.

Since the upper winding of the double-deck rotor contributes most of the torque during acceleration and has a much smaller thermal capacity, one can see what temperatures it may attain when the motor is accelerating a high inertia load. Even if excessive temperatures are not reached, the temperature differentials result in unequal expansion and contraction which may cause mechanical failure in the rotor bars. It is for these reasons

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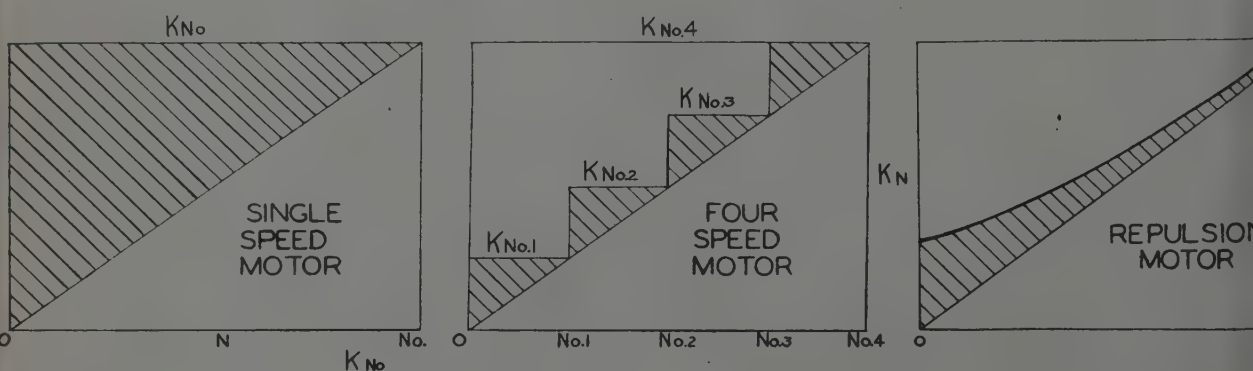
Fig. 8—Flywheel momentum is plotted against speed to show heating and other energy components relatively for single-speed, four-speed and repulsion motor



Seen and Heard in the MACHINERY FIELD

By Guy Hubbard Machine Tool Editor

SHRDLU ANTEDATES STORK: Reversing a precedent established by the late Samuel Langhorne Clemens, I wish to announce that the report of my advent (as a columnist) printed in last week's issue of STEEL "was greatly exaggerated".

At the recent annual meeting of the American Gear Manufacturers Association at Hot Springs, Va., piano virtuoso Henry L. Scott managed to play a difficult selection while wearing a pair of mittens. SHRDLU, however, either should remove his mittens or employ a Chinese abacus when he figures dates.

DYNAMIC HISTORY: All the good historians do not by any means "live in the past". We have in this country a number of industrial historians who perpetuate traditions by fostering modern production and marketing in the older manufacturing centers. One such dynamic historian-industrialist is William H. Worrilow, president, Lebanon Steel Foundry, Lebanon, Pa.

Mr. Worrilow is justly proud of the fact that for more than 200 years the hard-working, thrifty folk of Lebanon County have been turning out a wide variety of honest products which have found markets far beyond the confines of their county. These products have ranged all the way from Conestoga wagons to squirrel rifles—with recent emphasis on iron and steel products.

I can remember when Mr. Worrilow originally appeared among the machine tool builders of the Springfield-Windsor, Vermont, region where—as in the case of Lebanon Valley—industrial traditions likewise run strong. He helped such men as James Hartness, Edwin Fellows, George Gridley and Frank Cone to perpetuate their traditions by selling them on the advantages of steel castings for highly stressed parts of their machines—and by delivering the goods as promised.

In those days men who traveled on business could "take it". Rattling day coaches which were hot in summer, cold in winter and full of smoke, dust and cinders all year around were the prevailing mode of conveyance. Stopovers were made at old-fashioned American plan hotels which were long on hospitality and quantity of food but short on modern conveniences. Many of them had "livery and feed stables" out back where "rigs" could be hired at $1.25 per day for making calls in towns off the main line. I have a vivid recollection of one of those hotels which was patronized by Mr. Worrilow. I lived next door.

So much for the early career of William H. Worrilow as one of the active emissaries of Lebanon industry. Now a word about his more recent activities in the historical field. In keeping with the spirit of the Newcomen Society for the Study of the History of Engineering and Technology, of which he is a member, Mr. Worrilow has joined forces with Dr. Arthur D. Graef, leading antiquarian of the Pennsylvania Dutch country, and Miss Florence Starr Taylor of Lancaster, an accomplished artist.

The result of co-operation between these enthusiastic and talented individuals is an illustrated brochure entitled, "Lebanon County Through the Centuries—an Appreciation". This really is something to see—and to think about.

My own conviction is that what has been accomplished and what is being accomplished to keep Lebanon County, Pa., on the industrial map, is typical of what can be accomplished in many other places in these United States and in Canada. However, the people themselves must have plenty of gumption; there must be an element with constructive imagination; there must be capable local leadership and willingness to follow that leadership; there must be community pride and that pride must be expressed by the people in the efficient mass production of good products.

Last but by no means least, the world must be told about the products and enthusiastic, well informed trade emissaries must journey far and wide. Not only must these emissaries convince individuals and industries that they need the products, but also they must see to it that they are delivered when and as promised. Men of earlier generations accomplished those missions on horseback, by canal boat, in horse-drawn vehicles ranging from buckboards to rubber-tired buggies and, as already mentioned, by day coach. Motor cars of every variety also have been used.

At the present time a new generation of traveling men—many of whom already know world geography through wartime journeys to the ends of the earth as members of our armed services—are all set to "take to the air" on selling missions which in speed and in distances covered will be without precedent. If the people back home in thousands of industrial communities both old and new will now settle down to their important jobs of making the innumerable things which the world-at-large needs, those who record and interpret events will be able to add glowing chapters to the industrial and economic history of America.

VERY IMPORTANT PERSONS: On a recent cruise with executives of the machine tool industry who were guests of the Navy, I was shown a memorandum issued to the officers of the aircraft carrier to which we were assigned. This emphasized that the machine tool industry had from the start been an extremely important factor in expanding the Navy to meet the war emergency. It further explained that this carrier cruise represented a small token of thanks on the part of the Navy for a big job well done.

The armed services designate civilian groups such as the one in question by a "code word" VIP (Very Important Persons). In this particular instance there evidently was no question on the part of the hosts as to the worthiness of their guests to be so designated.

Not in many a long day have I seen two groups which "hit it off" any better than did these Navy men and the machine tool men. Men who know how to manage fine, complicated mechanisms evidently have natural fellowship with those who design and build the machines which in turn create such mechanisms.

When Bill Kirk, president of the National Machine Tool Builders' Association, led his delegation down ladders and through manholes into the bowels of the carrier to have a look at the power plant equipment and other vital installations far below the water line, I overheard this favorable comment from an informal Naval spokesman, "Those fellows are no stuffed shirts!"

After having had "the run of the ship" for two days and after mingling freely with officers and crew both on and off duty, an equally informal machine tool spokesman in turn summed up his group's favorable impressions in these words, "These Navy boys know their stuff!"

MILLER FOR *Slotting Marine Bearings*

Special planer-type machine designed to dovetail slots in propeller-shaft bearings for naval craft has yet to turn out its first reject in 4 years of service

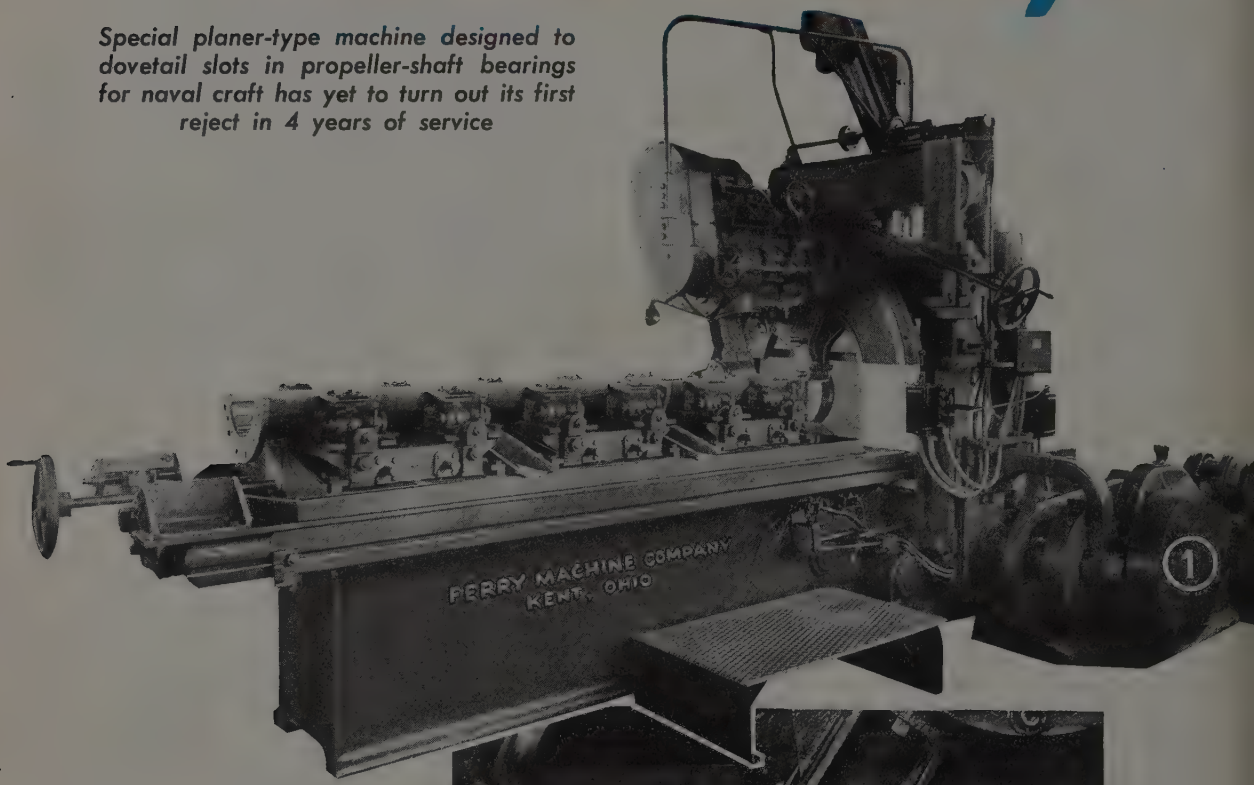


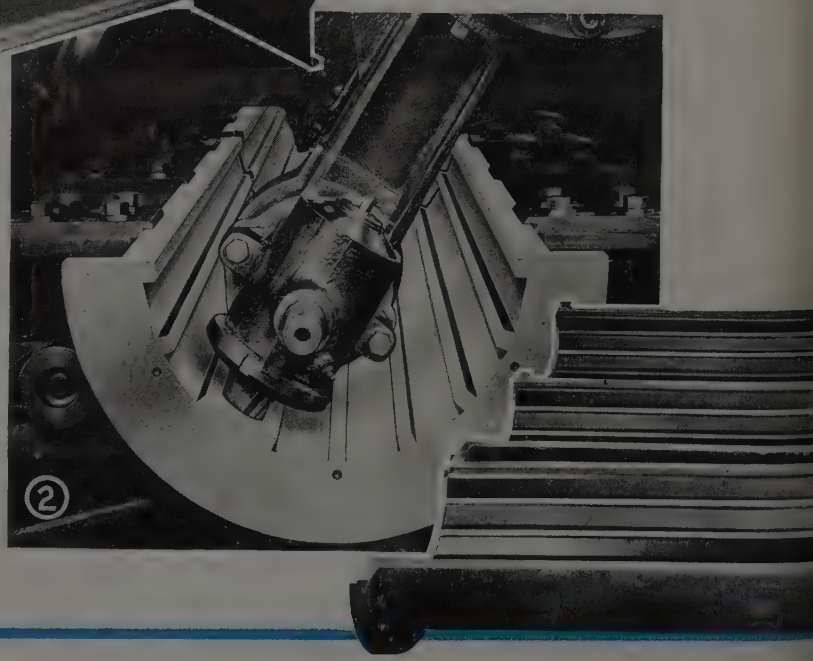
Fig. 1—Special milling machine for slotting bearing shells up to 28 in. in diameter by 10 ft long

Fig. 2—Roughing operation with head in vertical position

Fig. 3—Finished bearing shells with rubber-bonded brass strips in place in slots

Fig. 4—Front view showing medium size bearing partly machined with head in position for side cut

Fig. 5—Closeup of cutter head and change gear box with cross and down feeds



FOUR years of day and night continuous operation is the record of a war-born special planer-type milling machine which has "yet to machine its first rejected bearing." Since its birth in the Kent, O. plant of Ferry Machine Co., the planer has been on "military duty"—dovetailing slots in propeller-shaft bearings used in naval craft. Now, after "doing its bit," it continues to operate, doing the same job for commercial craft—milling bearings ranging from the smallest size weighing a few pounds, to the largest weighing several tons.

Upon the request of Lucian Q. Moffitt Inc., Akron, representatives for Cutless bearings—then used to a great extent on naval and commercial craft, machine was developed and built back when the submarine menace was growing acute. The bearing is of the type used on the propeller shaft of a ship or on the spindle of a hydraulic turbine.

Specific job of the miller is to machine slots around the interior surface of each bearing to enable a rubber-bonded brass strip to be inserted in each of the slots. The recess between the strips is used as a channel through which water flows for lubricating the rubber seat; it also serves to remove sand and other foreign substance found under water.

As shown in Fig. 3, the bearing consists of a centrifugally cast bronze shell designed to fit into a stern tube or strut housing. Complete shell comprises two halves. Each of these is split on the center line or on a slight taper to allow them to be compressed into the housing when moved into position longitudinally. Bearing strip slots have 10-degree tapered sides which lock the strips in place once they are inserted from either end of the bearing.

Ferry-built machine for the above job is shown in Figs. 1, 4 and 5. It handles bearings up to 10 ft long with inside diameters of 6¾ to 28 in. It also cuts slots in widths varying from 1$\frac{1}{16}$ to 5$\frac{3}{16}$ in., and in depths of $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$ and ½ in.

Chucking arrangement of the planer makes it possible to handle two or three small bearings simultaneously. Chucking unit consists of three separate stations with a space between and at the ends of each. This set-up permits a bearing flange to drop into the clearance recess, thus allowing the machine to handle several small bearings at one time. All three chucks are connected on both sides to a longitudinal spindle, manipulated by a hand wheel from the front end of the table. Jaws of the chucks thus are universally operated from the hand-wheel. Each individual jaw, however, has an independent slide capable of separate adjustment. And each slide, in turn, is equipped with a quick-operating clamp mechanism that can be applied instantaneously at any height.

Bearings with large diameters are handled by bolting the independent jaws to a set of chucks arranged for a 45 degree movement on clamping. Rigidity of the vertical clamp enables one to spring open the work while the horizontal independent jaw adjustment provides the closing necessary for the work.

Bearings are centered and aligned by adjusting the slides to centralize a hardened plug, located on the front of the spindle housing, and using an indicator on an arm which straddles the outside bearing surface. Clamping unit is also provided, at front, with an adjustment used to coincide the center line of the table movement with the center line of work location. Latter adjustment is made possible by location of clamping unit which is mounted on a separate table hinged at the rear and super-imposed on the planer table.

Design of the machine hinges around a housing that rotates within a 7½-in. diameter semicircle to accommodate the smallest bearing diameter. The small housing with restricted interior space for gears, bearings, spindle etc., does not provide room for making internal adjustments for size or depth of cut. Thus cutter spindle housing is mounted on a neck-like extension or bracket bolting to the bottom of a gear box. Latter is suspended at clearance height above the plane of work and clamps. Gear box is supported to cross rail by two adjustable slides each at right angles to the other. Both slides are actuated through lead screw spindles and gearing.

The entire gear box and both slides swivel in a plane

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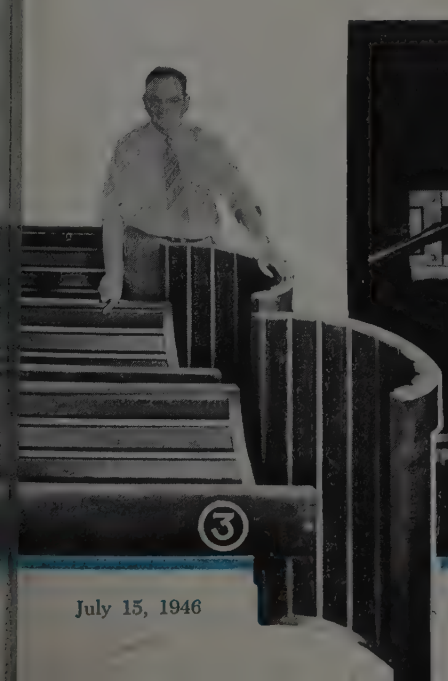

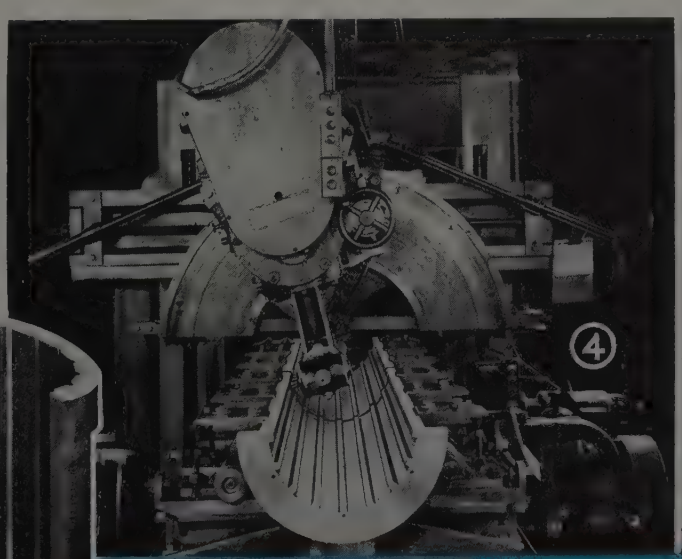

DESCALING and DESANDING Gray Iron Castings

Method makes use of sodium hydride process in connection with salt bath furnace produced by Ajax Electric Co. Inc.

DESCALING and desanding is a familar story to the metalworking industry. Much has been published in the past on such methods as pickling, sand and shotblasting, yet comparatively little has been said, thus far, on more modern processes for these operations.

A process which is receiving some attention is that developed by DuPont in Wilmington, Del., in which a sodium hydride bath is used. So far, most descaling by this method has been confined to stainless steels and alloy mills. The possibilities, however, are far-reaching, and new uses are being discovered constantly.

One of the more pertinent and successful of the latter is the descaling and desanding of ferrous castings and forgings. This is being done by a large midwestern manufacturer of oil-pump bodies and parts of gray iron.

The DuPont process actually employs a sodium hydroxide bath in which sodium hydride, a powerful reducing agent, is present. This combination acts to remove oxygen from any of the oxides formed on the metal being descaled or desanded. Consequently, even so refractory a material as sand will be modified chemically. Such modification greatly facilitates its removal from the surface of castings when the material is treated in a sodium hydride bath followed by the usual washing operations.

When castings and forgings are immersed in a sodium hydride bath, most of the scale, in its reduced form, remains on the metal when the latter is removed from the bath. The reduced products subsequently are expelled by quenching the hot work in a water bath at room temperature.

Setup adopted by the midwestern company is quite simple. It uses a salt bath furnace being produced by Ajax Electric Co. Inc. of Philadelphia, employing the immersed electrode heating principle.

Entire operation consists of the following movements: Work is first immersed in the bath of molten caustic soda which contains a small percentage of sodium hydride. Temperature is held to within 5°, plus or minus, of 700° F at all times. This is due to the vigorous stirring action caused within the bath by electromagnetic forces which, in turn, are created by the grouping and design of the closely-spaced electrodes. The bath loosens any sand, scale, or foreign matter adhering to the surface of the castings or forgings. Sodium hydride is produced by chemical reaction of sodium and hydrogen by means of a "generator" within the caustic soda bath itself.

Work next is immersed in a water quench, operating at room temperature. This removes the loosened material, and any caustic which might have been picked up in the reducing bath. Another water rinse at room temperature prepares the work for an

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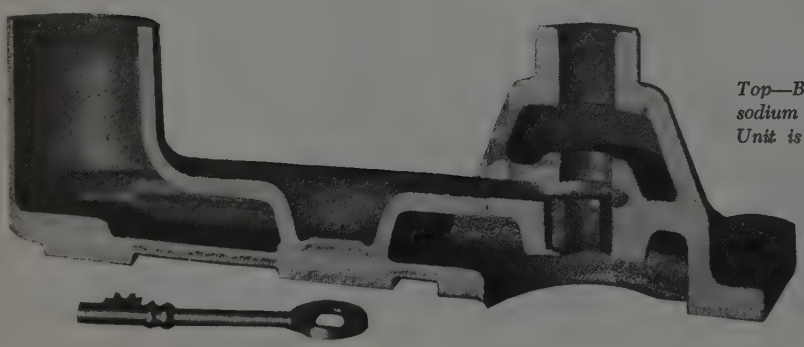

Top—Batch of gray iron castings being lowered into sodium hydride bath for descaling and desanding. Unit is Ajax-Hultgren salt bath furnace with gross capacity of 1250 lb per hour

Left—Section of a typical gray iron casting which has been descaled and desanded by process described here

Combination of various types of welding and use of lightweight metals provides Lockheed's "Shooting Star" engine a horsepower-weight ratio of two horsepower per pound

More than 500 Welds

Used in Aircraft Jet-Propulsion Gas Turbine

WHEN Lockheed's plane, Shooting Star, breached the continent in a matter of 4 hours, 13 min and 26 sec, few persons realized the part played by welding in enabling the jet-propelled craft to average 584 mph. Few guessed that more than 500 welded joints were involved in the engine, and that practically every known type of welding was used by General Electric Co. at Schentectady, N. Y., in developing the I-40 jet-propulsion gas turbine which powered the plane.

The all-welded construction, together with the use of lightweight metals gave the engine a horsepower-weight ratio of better than two horsepower per pound, General Electric reported.

In constructing the engine, each different type of weld was used where its application provided the best advantage. For example: The circular seam welding of a flange to the outer exhaust cone as shown in Fig. 1, is done by resistance seam welding, and many parts in the exhaust unit assembly itself, where pressure-tight welds are not a requirement, are spot welded.

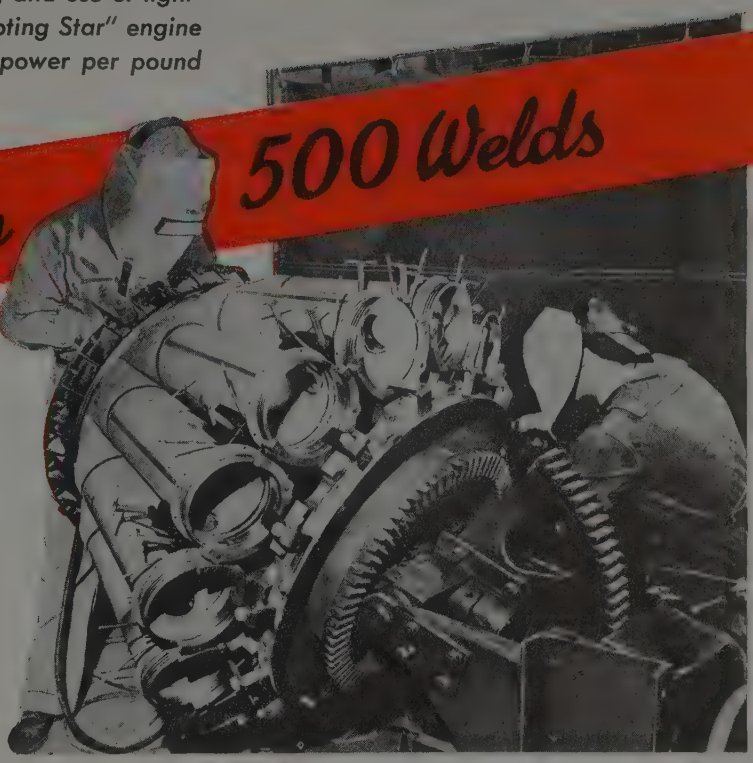

Fig. 1—Circumferential seam welding of large flange to cone assembly

Since the intense heat of combustion creates very high operating temperatures, about 1500°F, heat-resistant alloys are required for the combustion chamber and the exhaust unit. In order to keep down the weight of the jet engine, heat-resistant alloys were used in sheet form, some as light as 0.022-in. in thickness.

The austenitic stainless alloys offer high strength and good corrosion resistance at high temperature. By welding these parts, the engineer was able to design for minimum weight with maximum joint efficiency, both in thermal strength and physical strength.

Fabrication of various parts from sheet metal, however, led to one of the real production problems at GE, and it was only through the closest co-operation between the design engineers, manufacturing department and the welding engineer that the correct procedure for making parts was finally established.

Fig. 2—Welding cross-over tubes to flame tubes by atomic-hydrogen process. Photos in both Fig. 1 and 2 were taken at ITE Circuit Breaker Co., subcontractor fabricator

Fabrication included joint design, fixturing, welding process and machining procedure. In considering joint design, it was first necessary to design for strength. Then weight, distortion and gas flow were closely checked.

For example, a joint where it was necessary to join pieces of different thickness, it was known that minimum weight would be obtained by using a straight butt joint. A joint of this type, however, would set up a stress concentration in the thinner piece and encourage failure in service. Fusion welding of this joint would also cause greater distortion. Therefore, where the flanges were welded to the exhaust casing or the ring holders as well as to the flame tubes, a lap joint was used and the weld was generally made by resistance seam welding. The joint proved tight, had

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Railworthy WHEEL-MAKING at Armco's Butler Steel Plant

Following account reveals how a wrought steel wheel of low internal stresses is produced—from ingot to finished product. It details forging, heat treating and rolling practices

TAPERING, corrugated ingots resembling huge ears of corn are literally sliced into railway type wheels at the Butler, Pa. plant of American Rolling Mill Co. Here wheels are made for freight and passenger trains, for cranes, subway and surface cars. Here also, wheels weighing more than ½-ton each are designed and tested for modern speeds, and constantly observed to determine why wheels act as they do in service.

Methods used in the manufacture of wrought steel wheels at the Pennsylvania plant are the result of an aggressive research program. One factor, for example, is the "torture chamber" where wheels "sweat it out." Here research men run wheels at speeds well over 100 mph, brake them severely, make them white hot, and sometimes even deliberately crack them up. In the chamber, researchers in a few minutes produce thermal cracks and shelling that once required years of testing in actual service.

Balanced analysis is another factor in producing wheels such as those shown in Fig. 1. The stress-resistant units have low internal stresses, and continue to resist stresses built up in service. Steel for the manufacture of wheels is made in a 120-ton basic open-hearth furnace. Raw materials—pig iron, scrap and limestone—are accurately analyzed, and only those having the best properties for wheel steel are selected. Ladle analysis of a heat of steel usually falls within the limits of the specification to which the wheels are made. Majority of heats for wheels not to be heat treated, however, show around 0.72 per cent carbon, manganese about 0.70 per cent, sulphur about 0.025 per cent, phosphorus under 0.02 per cent and silicon from 0.20 to 0.25 per cent. For heat-treated wheels, carbon content depends on the particular class specified, ranging from a maximum of 0.63 per cent for class A to a

Fig. 1—Wrought steel wheels awaiting shipment in Butler, Pa. plant of American Rolling Mill Co.

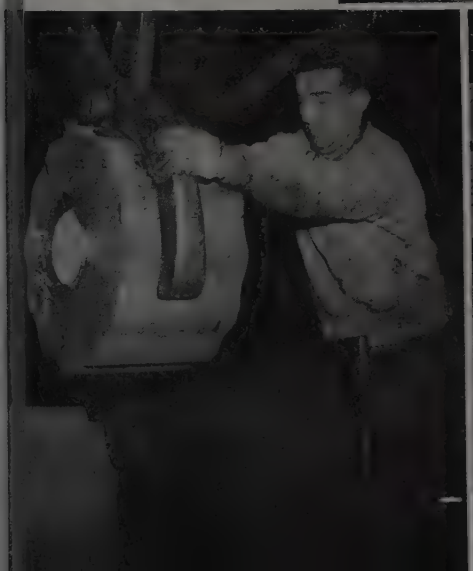
Fig. 5—In this view, one of the ingot slices is being taken into the heating furnace, where it is moved through the gas heat slowly until it reaches required temperature for pressing

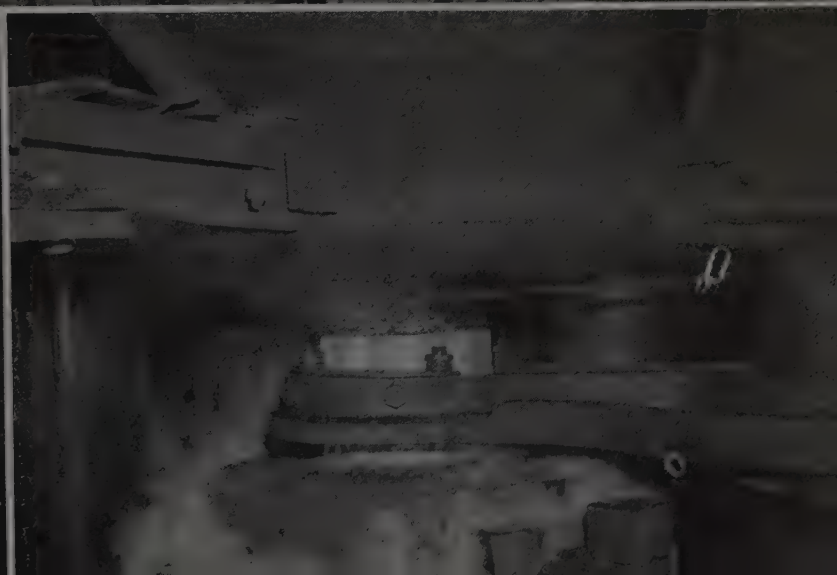
Fig. 6—Here dies of a hydraulic press are shown descending on the heated, glowing slice

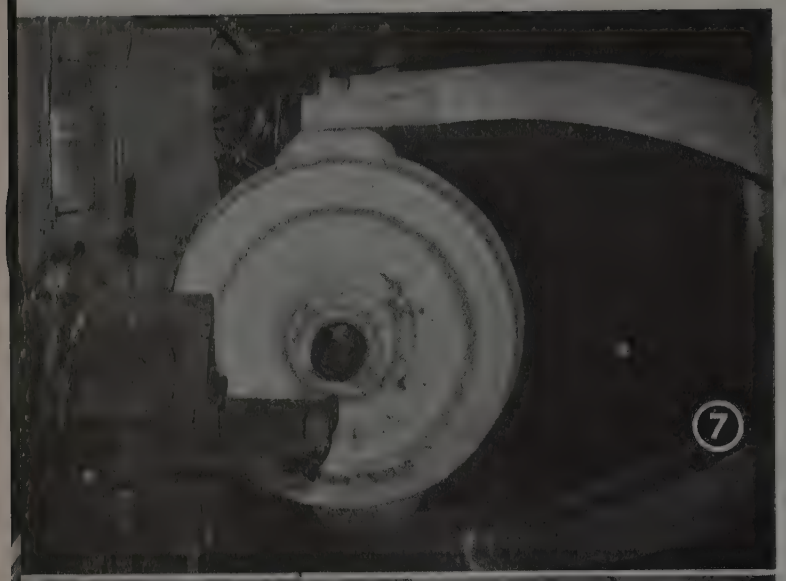
Fig. 2—Huge corrugated ingot here was just picked up from stock pile and is heading directly for the "nicking" lathes

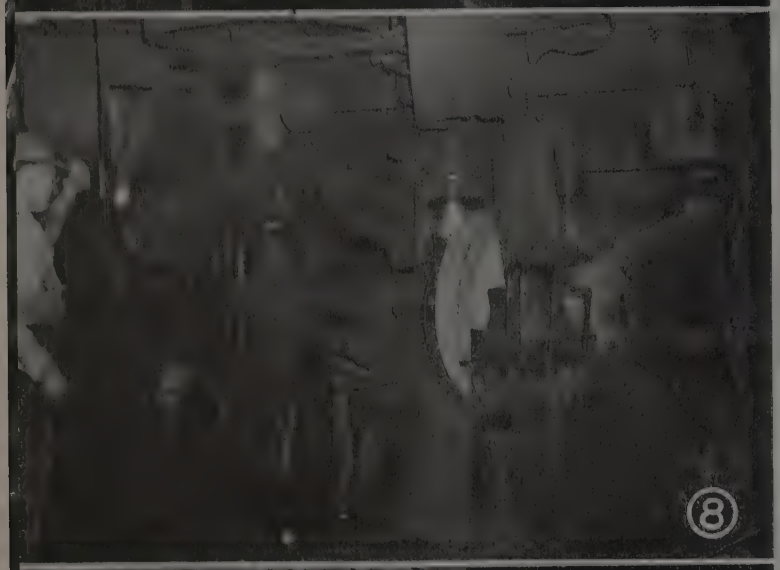
Fig. 3—Here ingot is literally being sliced by these huge cutting tools as it revolves

Fig. 4—Following "nicking" operation, ingot is brought to this "breaking" press where sliced blocks are pried off









maximum of 0.77 per cent for class C.

In creating wheels at the Butler plant, steel from the furnace is first cast into corrugated or fluted ingots measuring 14, 16 or 20¼ in. in diameter and equipped with hot tops. This is done after the steel has been in the furnace about 14 hours to bring the metal up to desired composition, and to proper condition and temperature. Molds used are of size and general proportions determined by extensive metallurgical tests to reduce to a minimum shrinkage stresses and other possible ingot variations. Many ingots have been sliced longitudinally and their structures examined microscopically, chemically and by sulphur prints, the studies resulting in the development of the type of mold now used.

The brick-lined hot tops are extremely tapered, and are designed to help produce sound ingots, serving to keep the metal in the upper part of the ingot molten, and "feeding" the ingot as it solidifies and shrinks, preventing a "pipe" from forming.

After cooling, ingots are placed in stock piles. From there, as in Fig. 2, they are picked up and brought to one of the specially designed nicking lathes, such as the one shown in Fig. 3, where cutting tools slice the ingot into wheel blocks of a length and weight suitable for the size wheel to be made. Cuts are made to a depth within 2 in. of the center of the ingot. Then, after the heat number is marked on each segment, the nicked blocks are broken apart by a hydraulically-operated wedge of a breaking press shown in Fig. 4. This method gives a fractured area 4 in. in diameter that allows the entire cross section of the block area to be inspected for "pipe," grain structure and porosity. This is said to be the only method that permits such an inspection to be made. In the breaking operation about 20 per cent of the weight of the ingot is discarded. This part includes the hot top and about 3 in. of the ingot itself.

Great care is exercised in heating the blocks for forging. They must be heated slowly to a uniform temperature through-

Fig. 7—Wheel now taking shape, is on its way to be reheated for further processing

Fig. 8—After being reheated, wheel is revolved perpendicularly in this special rolling mill where forming rolls shape it to the necessary requirements

Fig. 9—Machining operation here brings wheels down to exact size. Two types of lathes are used; finishing may include hub as well as the tread

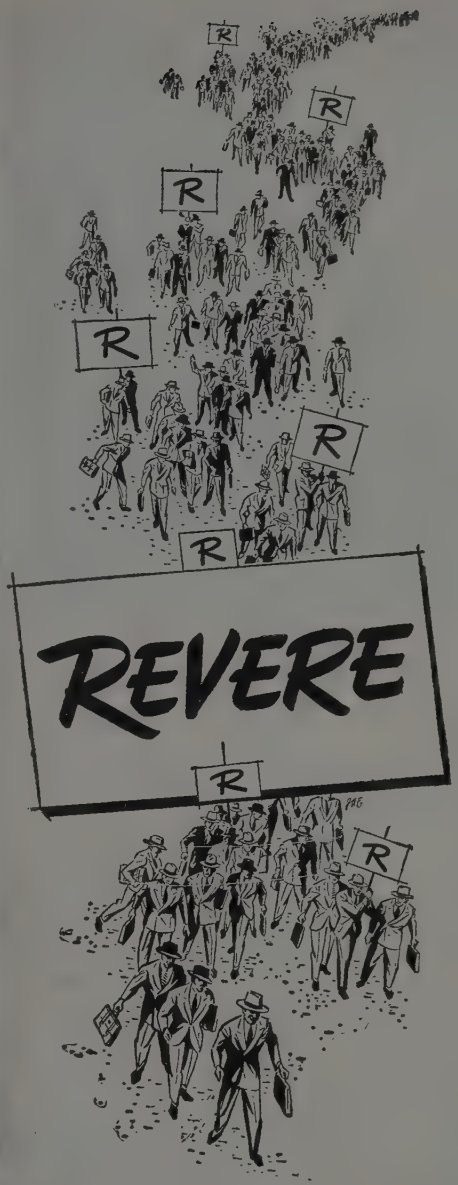


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Fig. 10—Some type of wheels are heat treated. Here, one of these is being hot quenched in oil

out without burning. The blocks are charged into the cold end of a gas-fired continuous furnace where they are gradually brought up to a temperature of 2050°F, then soaked until thoroughly heated. The heater, with the aid of his recording pyrometers, watches the blocks closely, maintaining correct temperature, making sure every block is in proper condition for the forging operation. Fig. 5 shows one of the blocks heading for the heating furnace.

From the heating furnace, a manipulator places the block end up on the bed of a 9000-ton forging press. It is cleaned of scale, and a stroke of the press

Fig. 11—Wheel hardness is being determined here. Rim and hub is subjected to this final test

die flattens the block, increasing its diameter and roughly outlining the hub, plate and rim. Then, without reheating, the block is immediately transferred to the 10,000-ton forging press which slightly expands the blank, forming the flange and following up the forming operation on the hub, plate and rim. The forging operation also refines the grain of the metal, completely eliminating the crystalline structure of the cast ingot. Center of the ingot also is punched out in the press for the bore. Fig. 6 shows the blank under die of the hydraulic press.

Pressed blank then goes to reheating furnace which brings it up to rolling temperature. Fig. 7 shows the wheel, now taking shape, on its way to be reheated. Following the two forging operations, the temperature of the wheel drops to about 1700°F, and it is necessary to reheat the wheel to about 1900°F to prepare it for rolling.

Rolling operation is performed in a vertical type mill having a back roll bearing against the tread of the wheel, two rolls bearing on either side of the web, and two other rolls bearing on either side of the rim. The two web rolls, which are steam driven, revolve the wheel on its axis and reduce the thickness of the web. As rolling proceeds, the rolls bear on the inside of the rim, forcing the tread against the large-diameter, grooved, vertical roll in the back. This, as it revolves, forms the flange on the wheel. Diameter of the wheels also is increased in this operation. In Fig. 8 the operator is shown checking the wheel diameter. Rolling is stopped immediately when the wheel has reached the specified diameter.

From the rolling mill, the manipulator transfers the wheel to a 1500-ton dishing or coning press where latter is placed flange down. The top die bears on the front hub only, pressing it into its proper position with respect to the rim. At the same time, month, year of manufacture, the name "Armco," serial and heat number and carbon content are hot stamped into the back face of the rim.

On heat-treated wheels, in place of the carbon content, letters AR, AE, BR, CR or CE are stamped. The first letter denotes the carbon class and the second whether only the rim or the entire wheel was quenched. The figures enabled Armco to furnish the customer the complete manufacturing history of the wheel, order numbers, when it was shipped etc., no matter how many years it has been in service.

When the coning operation is completed, the wheel is placed vertically on rails until it cools below the critical temperature, but not below 1000°F. Then it is placed vertically in brick-lined pits.

In the pits, temperature of the hub, plate and rim equalize quickly. After 24 to 36 hours, they cool down to a temperature of 300°F or less. This controlled cooling is an extremely important part in the manufacture of the wheel. It serves to minimize internal stresses and prevents shatter cracks.

After cooling, wheels are given a hot-

(*Please turn to Page* 146)

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rboloy Cemented Carbide Sheet Metal Dies are gaining increased usage in a de range of applications involving Blanking, Cupping, and Drawing Operations cause experience proves they bring such desirable advantages as: unusually long life, closer tolerances on drawn parts, more continuous press operation, fewer jects", lower cost per piece, vastly improved surface finish (almost mirror-ooth, thus cutting down buffing time), and a substantial increase in output r press.

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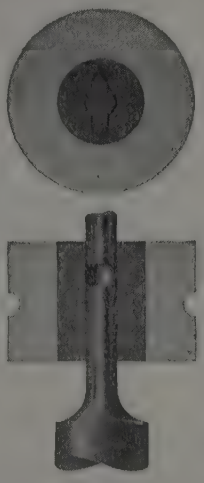
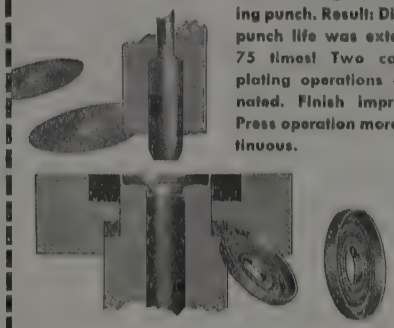
In deep draw and cupping operations on 2 in. and 7 in. diameter SAE 4130 chrome "moly" steel cylinders (and other alloy steel, mild steel, stainless steel and aluminum cylinders), the 20,000-piece average on steel dies was upped to 250,000 average with Carboloy Dies. Only .003" die wear after 500,000 feet. Down-time and scrap reduced 50%—production increased 25-30%.

GH WEAR RE-TANCE LEADS PRODUCTION NCREASE OF 142 TIMES



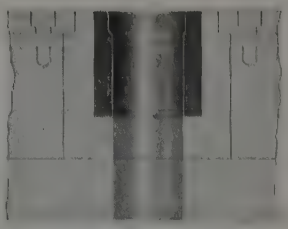
high-abrasive ceram-naterials, one manu-urer stepped up pro-ion from 700 pieces 100,000 by using boloy mould inserts. ordinary wear-resist-of Carboloy made possible.

DIE LIFE MULTIPLIED 75 TIMES



On tough beryllium copper parts, steel dies wear rapidly. Carboloy Dies replaced tool steel at two critical points, the draw ring and extruding punch. Result: Die and punch life was extended 75 times! Two copper-plating operations eliminated. Finish improved. Press operation more continuous.

HIGH PRODUCTION AVERAGE



Steel dies produced 60,000 refrigerator shells (drawn from steel .030 inch Replacing with Carboloy deep-drawi raised production to 700,000. Continuo production average was held despit tolerances.

8,000,000 PIECES WITHOUT REWORKING DIES

The job: Punching, drawing, trimming .0095 in. thick stainless steel (30% chrome) radio tube base parts, 87 Rockwell B, tolerance of plus-or-minus .003 in. Ordinary dies required dressing after every 50,000 to 60,000 pieces. With Carboloy Dies, this manufacturer turned out 8,000,000 pieces, *using only one set of dies, and without reworking dies for the entire quantity!*

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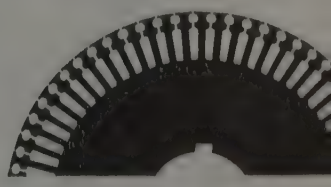
Carboloy Cemented Carbides enable you to increase production per individual die in your lamination dies. On one application, the best steel punch and die punches 150,000 slots, against *up to 5,000,000* slots with Carboloy Die Inserts and Solid Punch.

CLEANER JOB, FEWER SET-



Carboloy Dies and Punches for blanking a laminations give 10 times the life of con steel dies and punches, and greatly re number of punch and die set-ups. Cleane ing jobs, in less time, with fewer set-ups per job.

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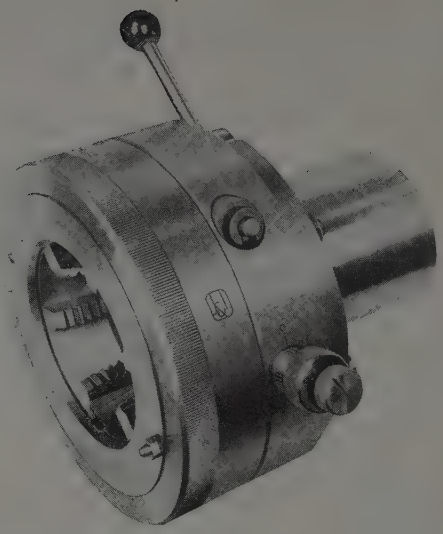
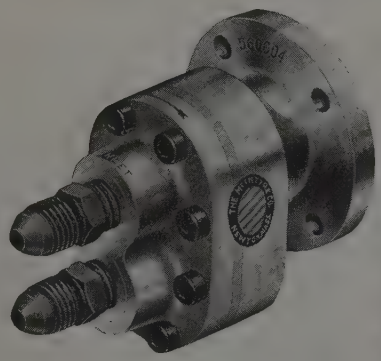
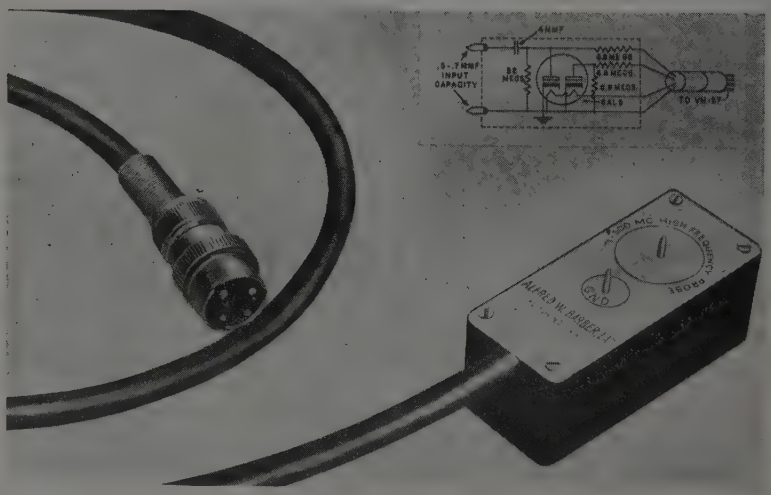


SELF-OPENING DIE HEAD: This automatic threading tool developed by Jones & Lamson Machine Co., Springfield, Vt., has threading capacity range from 2½ in. to 4 in. for heavy duty threading, and up to 4¼ in. for 8 pitch threads and finer. Built-in eccentric float combined with longitudinal float makes it satisfactory for use on heavy saddle type turret lathes

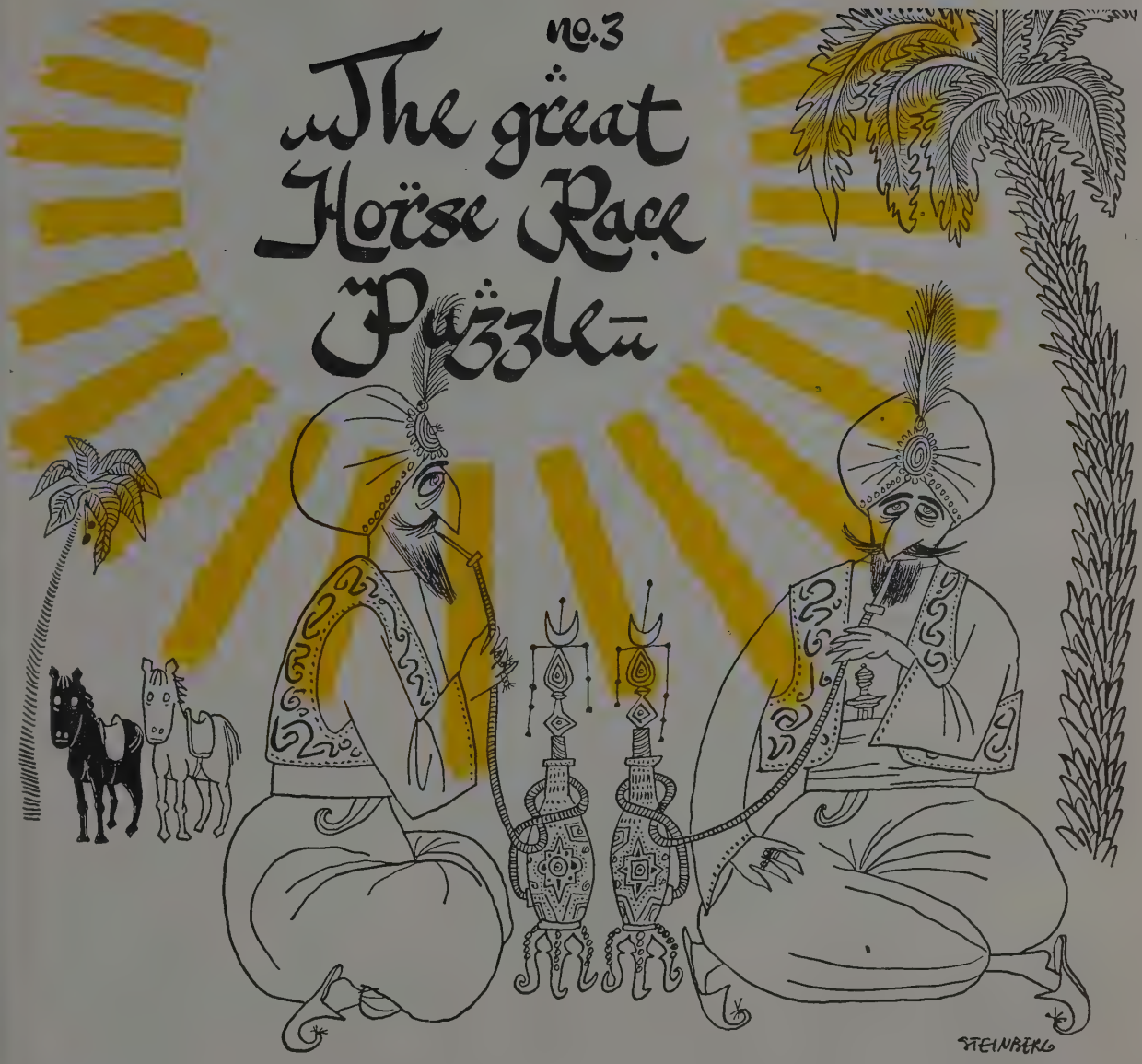
LATHE TOOL POST: Capable of making spherical, concave, convex, elliptical and conventional cuts on stock mounted in an engine lathe, this universal tool post manufactured by Allen F. Feaster Mfg. Co., Boulder, Colo., is said to reduce machine repairs and lost production time. Shown set up for convex or sphere turning operation, development also is adaptable for such operations as threading, facing and boring merely by resetting or changing tools. Finger-tip control enables operator to be in full command of his operation at all times



PRESSURE LUBRICATION: Small, 8 oz direct-drive gear pump shown here was designed by McIntyre Co., Newton, Mass., for pressure lubrication of bearings of machine tools, diesel engines, turbines, generators and other high-speed equipment. Three standard models displace from 0.08 to 1.5 gpm at speeds ranging from 1140 rpm to 3450 rpm against pressures up to 150 psi. Power requirements vary between 1/100 hp and 1/6 hp



HIGH FREQUENCY PROBE: Voltages in very high frequency circuits are measured by this device, developed recently by Alfred W. Barber Laboratories, Flushing, N. Y. With an input capacity of ½ to 1 micro-mf the range of measurements is said to be extended ten times, from 50 to 500 megacycles. According to the manufacturer the high frequency probe is adjusted accurately to one-tenth the sensitivity of a standard probe



Said an aged Caliph to his two sons: "My time has come. You each own a spirited steed, so I propose a race to Bagdad — and the son whose horse last enters the city shall inherit my estate." For weeks the two sons dawdled upon the road, each striving to go slower than the other. Then, one night at an inn, they sought the counsel of a wise man . . . and the next morning, at the crack of dawn, they lept to the saddle and rode for Bagdad as fast as the horses could run.

What did the wise man tell them?

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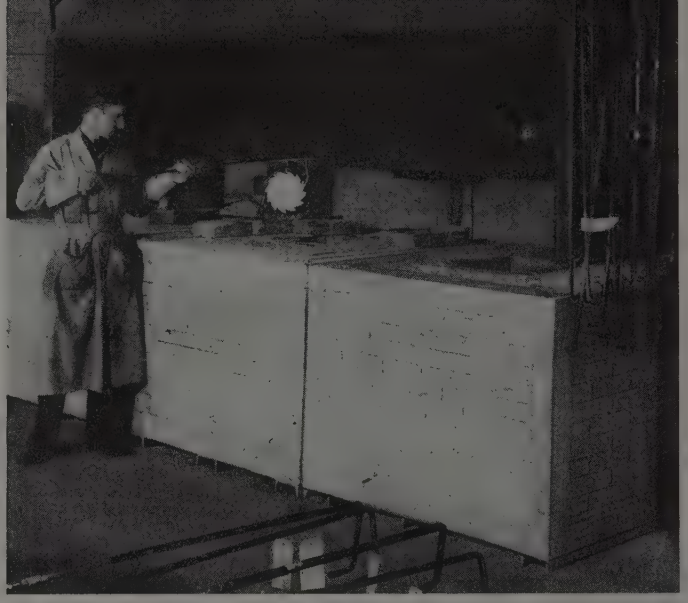
Treatment of steel salt baths prevents decarburization of work, eliminates sludge, and prolongs life of bath and electrodes



Carbon Rod Rectification

By STEWART M. DePOY
Metallurgist
Delco Products
Division of General Motors Corp.
Dayton, O.

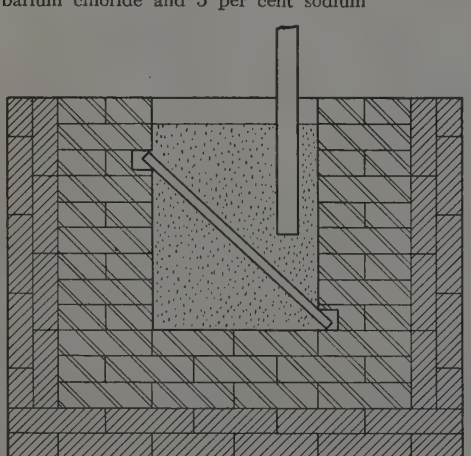
HEAT treatment of high speed steels by means of high temperature salt baths has long been an accepted method of procedure for both tungsten and molybdenum type steels. One of the problems which metallurgists had to overcome, however, was that of rectification of the high heat bath. Considerable attention was focused on this problem at E. F. Houghton & Co., Philadelphia, with equal emphasis being given to studies of the salt as well as the condition of the bath. Means of countering the difficulties attendant with the use of high temperature salts have been found through the use of a new salt and through the development of rectification without silica additions.

Analysis of this neutral salt, known as Liquid Heat No. 1550, is 95 per cent barium chloride and 5 per cent sodium chloride. It has a melting point of 1550° F and a working range of 1650°-2400° F, thus permitting heat treatment of high speed steels at the upper portion of its working range while other steels may be hardened at temperatures well within the lower limits. Used with an inexpensive rectifier, it is said to materially reduce heat treating costs. Increased fluidity of the salt further diminishes the cost, since the amount of drag out is less, and the amount of salt required for make-up purposes is therefore reduced.

In many instances where high temperature baths are operated, metallurgists have employed straight barium chloride as the salt in an effort to use a medium lower in cost than prepared mixtures containing a rectifier. To rectify the Ba Cl_2 bath, a silicate has been added, in either brick or powdered form. Knowledge of the correct proportion to add has come from trial-and-error methods.

Rectification of the bath is necessary, since the $BaCl_2$ picks up carbon from the work after the bath is in operation for approximately 100 hours where steel pots are used. Ceramic pots do not prevent this occurrence, although approximately 750 hours of operation elapse before decarburization begins.

Such decarburization of the work is caused by oxygen in the bath—a condition which required rectification. Con-



CARBON LOSS FROM WORK SURFACES
No Rectifier

Salt: E. F. Houghton & Co.'s Liquid Heat 1550.
Test Piece: G.M.—M2 Steel—Latrobe Electric Steel Co.—Heat #22319.
Original Carbon Content: 0.84%.
Operating Temperature: 2250° F.
Rectifier: None.
Average Electrode Life: 2650 hr.

Age of Bath Hr	Soaking Time of Test Pc. Min	Oxide Content of Bath		Carbon Content 0.005 in. Outside Layer %	Loss of Carbon	Decarburization Index
		Soluble %	Insoluble %			
240	5	1.60	1.96	0.76	0.08	9.5
240	10	1.60	1.96	0.75	0.09	10.7
240	15	1.60	1.96	0.60	0.24	28.6
264	5	2.00	3.5	0.72	0.12	14.3
360	5	2.12	3.1	0.70	0.14	16.7
398	5	2.21	2.9	0.73	0.11	13.1
491	5	2.18	4.00	0.73	0.11	13.1
542	5	2.43	2.8	0.73	0.11	13.1
590	5	2.56	3.1	0.72	0.12	14.3
662	5	2.28	2.52	0.58	0.26	31.0
662	10	2.28	2.52	0.55	0.29	34.5
662	15	2.28	2.52	0.52	0.32	38.1

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THE WHEELS OF INDUSTRY

CARBON LOSS FROM WORK SURFACES

SiO_2

Salt: E. F. Houghton & Co.'s Liquid Heat 1550.
Test Piece: G.M.—M2 Steel—Latrobe Electric Steel Co.—Heat #22311.
Original Carbon Content: 0.86%.
Operating Temperature: 2225° F.
Rectifier: 2 oz. of SiO_2 added per 24 hr.
Average Electrode Life: 720 hr.

Age of Bath Hr	Soaking Time of Test Pc. Min	Oxide Content of Bath: Soluble %	Oxide Content of Bath: Insoluble %	Carbon Content 0.005 in. Outside Layer %	Loss of Carbon	Decarburization Index
264	5	1.60	1.49	0.82	0.04	4.7
264	10	1.60	1.49	0.80	0.06	7.0
264	15	1.60	1.49	0.74	0.12	14.0
384	5	1.19	2.70	0.79	0.07	8.1
408	5	1.48	2.62	0.79	0.07	8.1
432	5	1.59	2.79	0.78	0.08	9.3
504	5	1.72	3.32	0.78	0.08	9.3
528	5	1.50	4.63	0.79	0.07	8.1
576	5	2.32	2.78	0.77	0.09	10.5
744	5	3.32	3.04	0.76	0.10	11.6
912	5	3.43	3.27	0.74	0.12	13.5
1176	5	1.69	1.09	0.72	0.14	16.3
1416	5	3.37	4.28	0.72	0.14	16.3
1416	10	3.37	4.28	0.70	0.16	18.6
1416	15	3.37	4.28	0.64	0.22	25.3

Carbon Rod

Salt: E. F. Houghton & Co.'s Liquid Heat 1550.
Test Piece: G.M. — M2 Steel — Universal Cyclops Steel Corp. — Heat #D-5087.
Original Carbon Content: 0.80%.
Operating Temperature: 2225° F.
Rectifier: AGR Graphite Rod.
Average Electrode Life: 3000 hr (estimated)

Age of Bath Hr	Soaking Time of Test Pc. Min	Oxide Content of Bath: Soluble %	Oxide Content of Bath: Insoluble %	Carbon Content 0.005 in. Outside Layer %	Loss of Carbon	Decarburization Index
240	5	0.46	0.87	0.80	0 00	0.
240	10	0.46	0.87	0.78	0.02	2.5
240	15	0.46	0.87	0.77	0.03	3.75
480	5	1.03	0.97	0.79	0.01	1.25
672	5	1.46	1.86	0.79	0.01	1.25
960	5	1.75	2.16	0.78	0.02	2.5
1152	5	1.87	2.05	0.75	0.05	6.25
1152	10	1.87	2.05	0.69	0.11	13.75
1152	15	1.87	2.05	0.64	0.16	20.0
1248	5	1.87	1.90	0.79	0.01	1.25
1248	10	1.87	1.90	0.76	0.04	5.0
1248	15	1.87	1.90	0.69	0.11	13.75
1344	5	2.28	2.19	0.78	0.02	2.5
1344	10	2.28	2.19	0.77	0.03	3.75
1344	15	2.28	2.19	0.76	0.04	5.0

tinued study of this problem has now resulted in a simple and inexpensive method, using an immersed carbon stick. An indication of the comparative decarburization in rectified and unrectified baths is shown in the accompanying tables. The improvement in the rectifying value of the carbon rod as compared to the silica is clearly evident in the difference of the percentage of carbon lost from 0.005-in. of the surface of the work.

Addition of silica oxide serves to rectify the bath, but the combining of the oxygen in the bath with the silica results in the precipitation of a sludge to the bottom of the bath. The sludge is not only difficult to remove, but attacks the electrodes, seriously shortening their life.

Use of an inexpensive graphite bar for rectification reduces the sludge precipitation to a negligible amount. Insoluble oxides in the bath from built-up layers on the carbon rod, from which they are removed easily.

Due to the buoyancy of the rod, it is necessary to anchor it in the bath; a method of successfully accomplishing this is shown in accompanying diagram.

Heat treating expenses may be greatly reduced by the prolongation of the useful life of the electrode. An indication of the comparative effects of salt bath rectification can be obtained from the table which shows how the electrode life is affected by the silica and graphite rectifiers.

Electrodes in unrectified baths have an average operating life of approximately 2650 hours, but serious decarburization of the work occurs in such baths. In those baths to which silica is added, the electrode lasts but slightly more than 700 hours — showing that even the moderate amount of rectification afforded by silica is expensive. The attack of the precipitated silica sludge on the electrode is the cause of the premature failure.

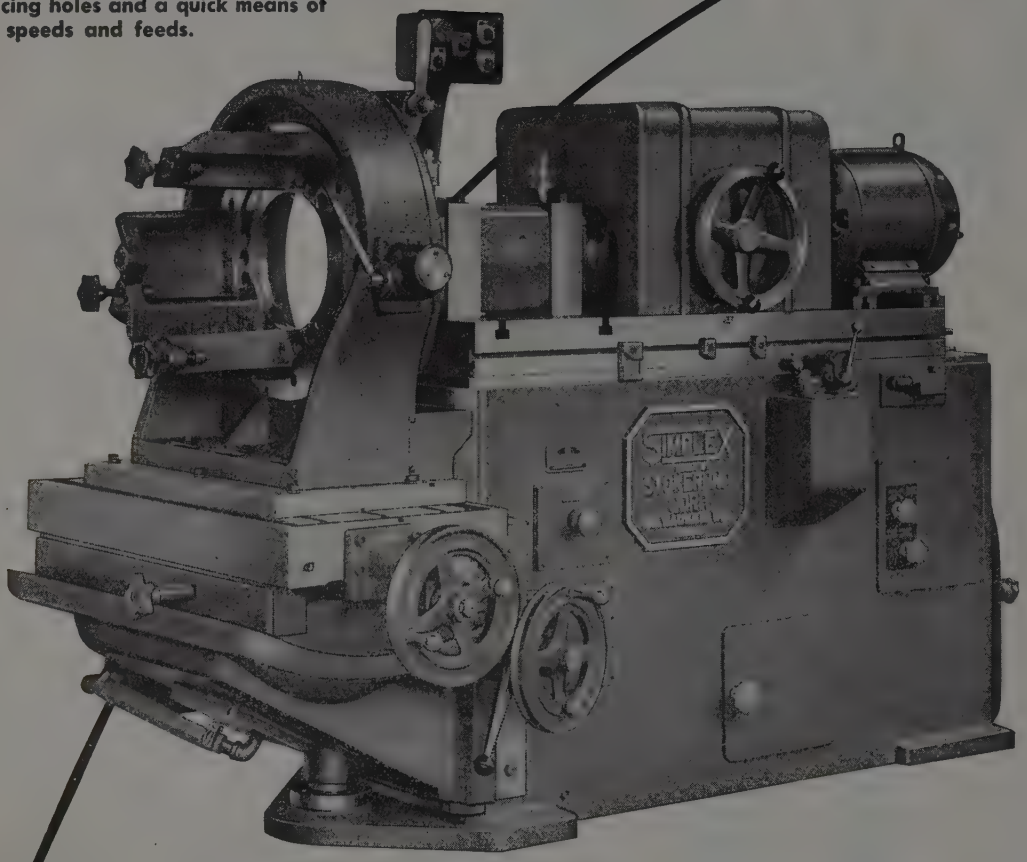
The graphite rod, when used with liquid Heat No. 1550, produces several advantages over both the unrectified or the silica-treated baths:

(1) Supplies the necessary rectification to prevent decarburization.
(2) Eliminates the need for silica, with its damaging effect on the electrode.
(3) Will measurably lengthen electrode life.
(4) This new salt is less expensive than heat-treating salts containing rectifying materials.

DUST-PROOF LIFT TRUCK: High-lift platform truck shown here handling prefabricated roof tile manufactured by George Rackle Sons & Co., Cleveland, includes built-in protection in its construction against grit and dust found in cement plants. Built by Elwell-Parker Electric Co. of the same city, the truck also is equipped with a hopper which allows it to transport 1½ tons of mixed cement. Tiles being handled weigh 224 lb, measure 2 x 8 ft, each being 1⅛-in. thick. They are used on steel-frame supported factory roofs

SIMPLEX

The shop which builds a variety of products in varying size lots, needs something much more flexible than the conventional type of precision boring machine. It must be able to handle jobs both large and small with a minimum of set-up and change-over time. It must be quickly aligned, equipped with an accurate method of spacing holes and a quick means of changing speeds and feeds.



THE BORING MACHINE FOR A THOUSAND JOBS

A SIMPLEX 3U Knee Type Precision Boring Machine is here shown with an indexing fixture for precision boring several parts in a heavy transmission. The hole sizes differ, so a quick means of changing speed is of great advantage. Various fixtures are used which can be made of the most desired proportions and the machine adjusted to suit the work. Boring and facing feed changes are quickly and conveniently made by means of the star knobs on the bed. All controls are within the operator's easy reach. One of the most valuable features is the fact that when once set up for a job, operation is reduced to loading and unloading the work and pushing the starting button. Let our representative study your work and tell you more of the many advantages of these advanced designs.

Precision Boring Machines

STOKERUNIT CORPORATION

SIMPLEX Precision Boring and Planer Type Milling Machines

4532 West Mitchell Street, Milwaukee 14, Wisconsin

ENGINEERING NEWS at a glance

PENETRATION of gases into portions of metal covered by a liquid die coating being produced by Geo. R. Mowat Co., New York, is said to be effectively resisted during heat treating and selective hardening operations. Furthermore, the product will not injure the surface of the metal. Coating is applied by brushing, spraying or dipping methods, bonding firmly after being set by heat. Heat required for heat treating is sufficient to set the coating, the company states. Sand or shot blasting or any subsequent grinding or machining operation removes the coating.

DIELECTRIC heating which, it is said, can reduce production costs in almost every industry, is now available in a new unit being introduced by Industrial Electronics Division, Raytheon Mfg. Co., Waltham, Mass. Because dielectric heat is generated within the product itself, and introduced by means of an intermediate agency, the company says the unit, known as Raytherm, performs in minutes work which previously took hours to accomplish. It eliminates necessity of steam-heated platens, and has the ability to suspend heating operations immediately, averting risk of damage through overheating. In addition, the unit provides uniform, unvaried results.

MIXTURE of Desmophen, believed to be a polyhydoxyl compound, Desmodur T, thought to be a di-isocyanate, possibly p-phanyl di-isocyanate and a solvent, apparently pyridine, make up the adhesive developed and used in Germany for laminating vinylite. According to a Department of Commerce report, the Germans say the adhesive is excellent for joining rubber to metal as well as for other uses.

ERECTION of an experimental plant for production of electric power by means of nuclear fission is being planned at Oak Ridge, Tenn. by Monsanto Chemical Co., it was learned here. Initial expenditure of two and a half million dollars already was provided for the construction which is still in the blueprint stage. The move marks the first effort to make use of atom-splitting for peacetime industrial use. Construction of the plant is under direction of the War Department, and Dr. Charles Allen Thomas, St. Louis, vice president and technical director of Monsanto, is to direct the project. According to Major General Leslie R. Groves, head of the Manhattan Atomic Project, the proposed project will be an attempt to learn whether or not atomic energy can be harnessed. Interesting sidelight on the above is the fact Army engineers recently ordered a 100,000,000-v atom smashing x-ray machine from General Electric Co. It is slated for the Clinton lab operated by Monsanto at Oak Ridge.

CHALLENGE to American inventors and mechanical engineers to develop better artificial limbs was issued recently by Dr. Paul E. Klopsteg, chairman of the committee on prosthetic devices, through facilities of the National Inventors Council. Stressing the urgent needs of 17,000 war amputees and an estimated annual minimum of 25,000 civilian amputees, he urged inventors and engineers to submit ideas and suggestions for better devices to NIC for analysis and screening.

SPEECH is transmitted over power wires by means of a carrier wave of radio frequency in the new telephones being tested by Bell Telephone Co., down in the Arkansas and Alabama area. Radio frequency is produced by electronic tubes located either in a small box adjacent to the telephone or attached directly to the instrument. A device called a coupler, placed on a pole outside each user's location, allows the carrier current to enter and leave the lines but prevents the power current from interfering with transmitting and receiving instruments.

SHAFT runout does not affect the performance of a mechanical seal developed by Sealol Corp., Providence, R. I., to seal leaking shafts and to exclude foreign materials. The company reports the only relative movement of the packless seal is at lapped faces. It slides easily into position on the shaft, being locked in place with two setscrews.

TWINDOW, an integral insulating unit of two or more plates of glass enclosing a ¼ or ½-in. hermetically sealed air space, developed recently by Pittsburgh Plate Glass Co., Pittsburgh, is said to be particularly useful in industrial building fenestration where processes require uniform temperatures and humidity. Hollow aluminum tubing is used in each unit to separate and hold the glass plates in position. Entire unit is framed with light-gage stainless steel channel with the channel legs extending ⅜-in. inward on the surface of the glass from the base around its periphery.

FROM Lansing, Mich., Hill Diesel Engine Co. reports it now has a stock of diesel engines for industrial purchasers. The company recently completed reconverting from war production. Engines available are those of its R line-vertical 4-cycle solid injection type industrial units with a horsepower range of 10 to 20 in 2, 4 and 6-cylinder models.

IN PITTSBURGH, it was learned, Eugene W. Beggs, manager of Westinghouse Electric Corp.'s vapor lamp section, recently prepared a booklet which explains the basic principles and operating characteristics of fluorescent lamps and auxiliaries. It shows diagrammatically the essential structure and operation of the mercury vapor electric discharge tube with its phosphor coating, and lists ratings of important types of lamps, including the Instant Start, Slimline and Circline. Mortality and replacement rate curves embodied explain factors effecting lamp life and maintenance.

DETAILS of an electronic chronoscope capable of measuring speed of detonation of explosives to within one-millionth of a second were disclosed by the Bureau of Mines, Washington, recently. Invented by C. R. Nisewanger and F. W. Brown, bureau physicists stationed at Bruceton, Pa., the instrument can be used for either lab or field measurements. Travel time of the detonation wave within the explosive is indicated on only one meter of the unit. Operation of the chronoscope is based on the time voltage relationship obtained when a capacitance is charged

through a series resistance. The development can be operated from a standard 110-v lighting circuit.

SIX carloads of airless Rotoblast cleaning barrels and tables were connected to a large dust control unit at the exhibit of Paugborn Corp. of Hagerstown, Md., during the Golden Jubilee anniversary of the American Foundrymen's Association at Cleveland. Riggers, electricians and painters worked for three weeks placing the equipment in operating condition for actual cleaning of green and hard iron castings, including heat treated parts. Such companies as Ferro Machine & Foundry Co., West Steel Castings Co., Ohio Steel Foundry Co. and other Cleveland concerns furnished 150 tons of work daily which was cleaned in the presence of American and foreign foundrymen who visited the exhibit.

VISCOSITY of aircraft hydraulic oils must be low and also must be affected as little as possible by the extremes in temperature at which the system operates. The pour point, or limiting temperature at which the oil remains fluid, must be exceptionally low to permit operation of the hydraulic units at the low-temperatures existing at high altitudes. According to "Lubrication," technical publication of The Texas Co., New York, resistance to oxidation also is important since oxidation products affect viscosity and tend to promote corrosion.

ABSENTEEISM caused by foot ailments can be cut down greatly by providing workmen with a ventilating type innersole manufactured by Dale Vent-O-Sole Inc. According to the New York concern, the non-medicated innersole pumps air into the shoe with each step taken by the wearer, circulating it over the grid of woven plastic evaporating and expelling the moisture-laden air. The innersole was developed on the request of the Quartermaster General's office to protect soldiers' feet. It is now becoming available in limited quantities for civilian use.

POLISHING operation is one of the most important steps in the manufacture of diamond dies for drawing wire. Surfaces that must be polished are the secondary cone and bearing. The cone and back relief also are polished, but degree of polish is of less importance. In a recently published booklet, North American Philips Co. Inc., New York, states that the method employed for polishing varies with type of die being polished. A vertical polishing machine is used normally for hard wire dies. Soft wire dies are usually polished on a horizontal machine where both the die and needle revolve, and a high polish in the bearing is obtained without changing the channel length of the die. On the vertical machine, the hard die revolves at high speed and a finely ground needle mechanically oscillates from left to right. This swaying action blends the angle between the cone and secondary cone of the die to give it a smooth entrance and at the same time the bearing is polished and elongated.

COLD bend of 30 degrees around a 1-in. pin without cracking is possible with a ¾-in. nickel alloy bolt developed by American Cast Iron Pipe Co., Birmingham, for use with a mechanical joint pipe under corrosive conditions. According to the company, the bolt, when malleablized, has a tensile strength of 80,000 psi, and a yield point over 50,000. Called Ni-Resist, the development is electronegative to cast iron and, when used with a mechanical joint pipe, cathodically protected against galvanic corrosion.

IF USE of uranium as a possible source of power can be sufficiently divorced from its military use, the extensive researches that would be prerequisite may go forward more rapidly, according to a paper presented by S. C. Lind, dean of the Institute of Technology, University of Minnesota, before the meeting of the Electrochemical Society in Birmingham recently. He stated A. H. Compton predicted that in about 10 years we may have uranium power plants without smoke, noise or ashes. Salubrious as this would be, one wonders whether the hazards arising from radioactive fission materials both gaseous and solid, not to speak of the possibility of explosion, would be so great as to dictate location of uranium power plants so far from center of population that smoke would be quite secondary and innocuous.

WORKERS who fail to wear gloves when using solvent-laden rags to remove grease from bearings or when wiping up spills are engaged in careless practices which may lead to dermatitis. According to the Safety Research Institute of New York, improper use of industrial solvents is the third largest cause of occupational skin disease, accounting for 7.8 per cent of all such cases. Since each year 1000 of every 100,000 workers are afflicted with some form of dermatitis, 78 of every 100,000 suffer from solvent dermatitis. It is estimated that each year 1560 cases of solvent dermatitis of sufficient severity to be compensable occur with loss—including wage loss and cost of medical care—of about $312,000.

OPERATION of newly developed ductility testing machine being produced by Steel City Testing Laboratory, Detroit, consists merely of placing specimen in opening between grips, and closing control valve. From there machine applies load automatically, with the penetrator forming the cup. Reversing of control valve releases pressure and all functioning parts return to their original position, allowing specimen to be removed easily. Machine, called the PA-3 model, is manufactured in two sizes—one with a 15,000 and the other with a 30,000-lb capacity

ONLY 20.6 tons of beryllium were produced by Germany and Italy during the war according to a report made to the Department of Commerce, Washington, by B. B. Sawyer, president of Brush Beryllium Co., Cleveland, and H. A. Sloman of the National Physical Laboratory, Teddington, England. Methods used by both countries in the production of the metal were described in detail. The German beryllium industry was concerned primarily with heavy alloys and with a 0.2 per aluminum alloy, used for sand cast cylinder heads of airplane motors. Pure beryllium oxide was used chiefly in the light metal industry. Beryllium metal was sold mainly in the form of electrolytic flake. Beryllium copper alloys were produced and sold as forgings, stampings, rolled plate and drawn rod and wire.

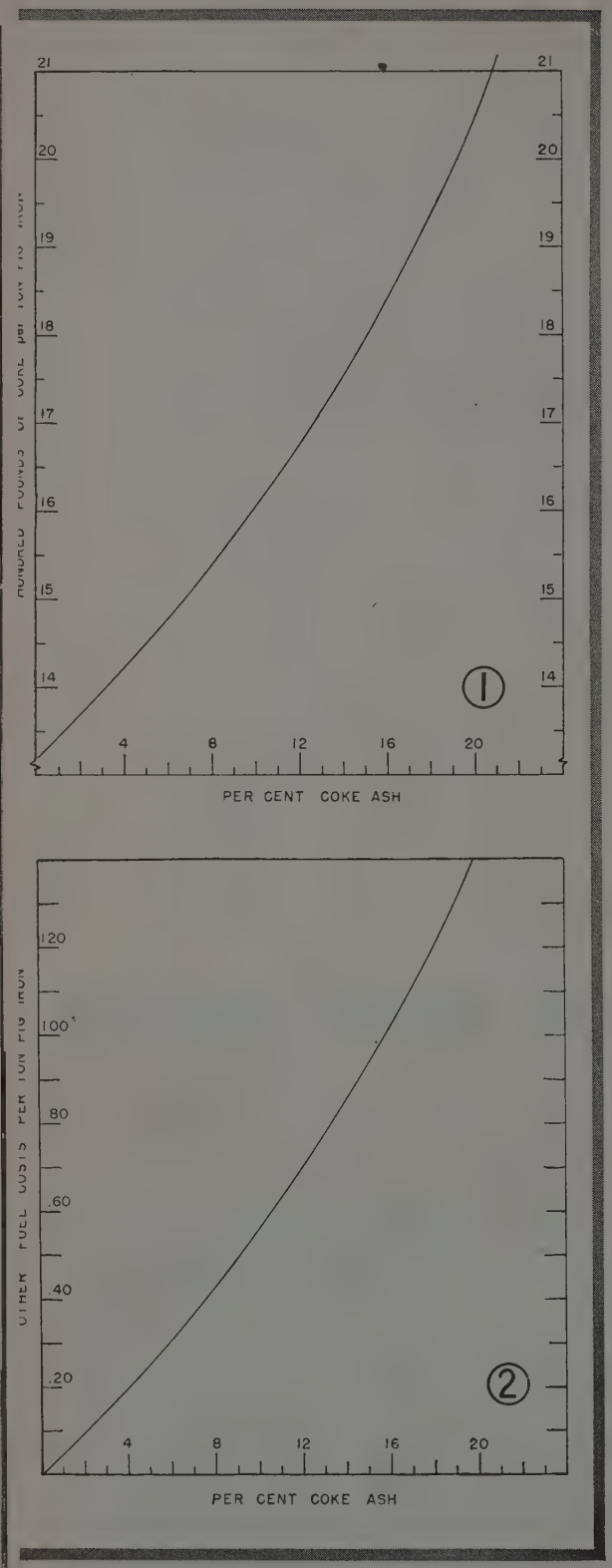


Fig. 1—Theoretical coke consumption per ton of pig iron vs per cent coke ash

Fig. 2—Theoretical fuel cost excluding coke per ton of pig iron vs per cent coke ash

Blast Furnace

FUEL COST ECONOMY

and its relationship between washed coal yield and ash content is dependent upon certain factors which the author considers separately in connection with the stack, coke plant and its washery

By W. M. BERTHOLF
Efficiency Engineer—By-Product Coke Plant
Colorado Fuel & Iron Corp.
Pueblo, Colo.

WHILE considerable emphasis is laid on the washing of coal, it is not to be assumed that the principles used in this analysis are of value only in connection with a coal cleaning operation. They can be applied equally well to a comparative evaluation of coals which are not washed.

The reject from a coal washery is not the only kind of "waste" involved in the selection and/or preparation of coal for use in the production of metallurgical coke. Coal and money can be wasted by doing too little washing, as well as too much washing. And even though a coal is washed at the proper point of separation it is altogether too likely the wrong coal is being washed, in which case the "waste" may be greater than one would ever suspect.

Obviously, no simple analysis of the problem such as is presented here will give us *all* the answers about what kind of coal is best for use in a particular situation; but it is submitted for consideration that a coal which cannot justify its use by the standard of ash and yield should be carefully studied to make sure that it is an economic asset instead of a liability.

While uniformity is worth a great deal to the blast furnace operator, some classing it as more desirable than low ash or high physical strength, *per se*, we are definitely of the opinion that if an operator is interested in obtaining uniformity it might as well be uniformly high quality as uniformly mediocre quality, and at the minimum over-all cost.

For a given coal, which requires washing, the minimum fuel cost will be obtained only when we have removed just the right amount of objectionably high ash material to strike a balance between the cost of washing it out and the cost of slagging it out. In this paper we are concerned only with ash. Sulphur could, conceivably, be used as one of our variables; but it is hardly feasible—since it would require a 4-dimensional analysis.

One of the time-honored systems for determining the correct point of separation in the washing process is to apply a certain credit for each per cent of ash removed (varying from 9 to 30 cents, depending on the experience or optimism of the calculator) and deducting from this credit the additional cost due to the decrease in washery yield. In practice this is only as sound as the selection of the credit per unit of ash. Theoretically it is a trifle difficult to justify this method for general use, for we know that the relationship is curvilinear, yet this fact is usually ignored.

Other schemes have been advocated which are closer to the theoretically correct method; but most of these do not take into consideration the possibility of variations in washery efficiency. They are not flexible enough for our purpose, although they can be made so by a separation of the variables of washed coal ash and yield.

Anticipating criticism, it may be said at the outset that this scheme is not intended to provide the furnace operator with adequate data for operations. We realize that blast furnaces are notorious for doing the unexpected (as well as the impossible), and do not expect that in each and every case the results obtained can be satisfactorily accounted for. But, if and when all other things remain the same, the effects of coke ash must be approximately as indicated by this analysis. To this extent, we are correct.

Fundamental Considerations: The answer to our problem of determining the relationship between washed coal yield and ash content and fuel cost at the blast furnace depends upon factors which may be considered separately in connection with the coke plant (including the washery) and the blast furnaces.

At the coke plant there are several factors. One over which we have no direct control is the delivered price of the coal, and this is assumed to be constant. It is also the starting point in cost calculations. The second factor (a variable) is the washery yield, and direct control is had over this. Another important variable factor is the washed coal ash. For the purpose of analysis, the washed coal yield and washed coal ash are considered as independent

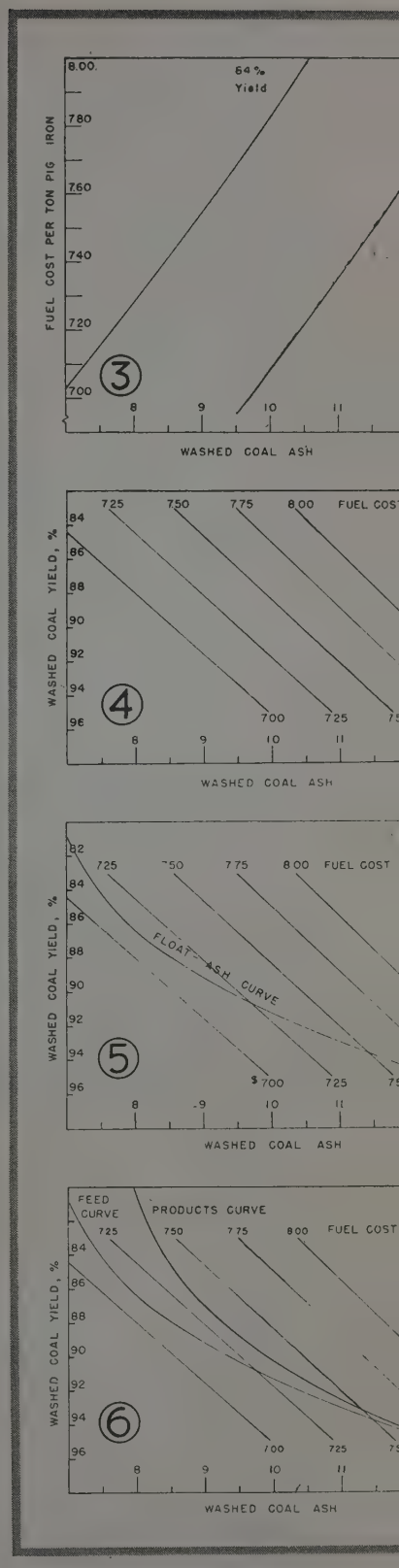


Fig. 3—Fuel cost vs washed coal ash at various washery yields (Coal "A")

Fig. 4—Fuel cost contours (Coal "A")

Fig. 5—Fuel cost (Coal "A") with perfect separation in coal washery

Fig. 6—Fuel cost (Coal "A") with average separation in coal washery

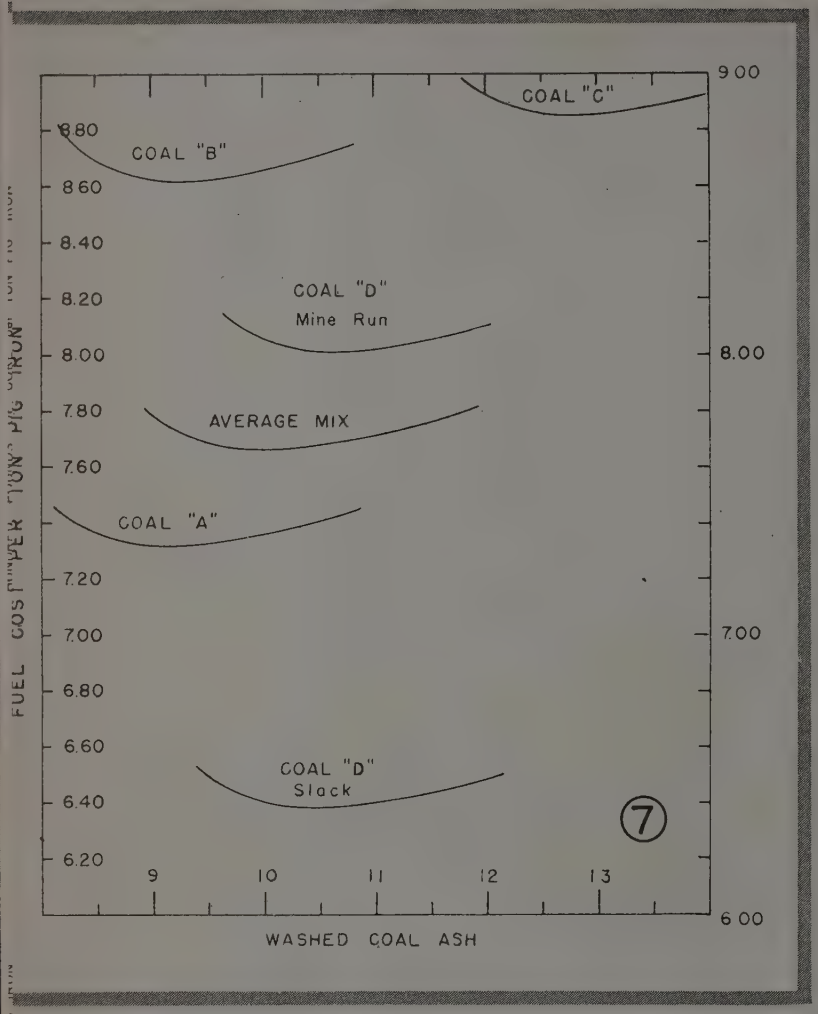


Fig. 7—Comparison of fuel cost per ton of pig iron using various coals and with normal washery practice

variables. Operating costs at the washery and at the ovens enter into the problem, and are considered constant.

It is ordinarily assumed that the relationship between ash and yield of washed coal is settled once and for all by the washability curves of a coal. This would be true if it were possible to make a perfect separation at any given gravity —a condition more to be hoped for than expected. Since washery operations do not precisely follow the theoretical relationship of yield and ash, the two variables have been separated in the interest of getting a more flexible or comprehensive view of the actual situation.

Washed coal volatile is closely related to the ash content, and this fact is used to good advantage in a simplification of the calculations.

At the blast furnace, fuel costs per ton of pig iron are dependent on the amount and price of coke, plus certain other charges which are (also) functions of coke quality. Increase in furnace overhead cost due to decreased production when using a higher-ash coke is a major charge against poor fuel quality. Additional limestone due to increased coke ash is also important. If coke had a constant price it would be possible to combine all three of these as functions of coke ash. As will be seen, the actual cost of the coke is independent of its ash content, and must, therefore be considered by itself; but the other two factors may be combined into a single item designated "Other Fuel Costs" or "Fuel Costs, Exclusive of Coke."

All of this has been used as the basis for every analysis of the problem, and the principles are generally accepted as sound. There are, of course, certain approximations in all these systems. Experience has shown that these are sufficiently close for the purpose of making comparisons, even though they are not exact. Small errors in the absolute level will not necessarily invalidate the comparisons, and certainly a comparison involving theoretically sound approximations is better than no comparison at all.

Factors at Coke Plant Washery:

1. *Washed Coal Cost*: It is obvious that the washed coal cost is a function of raw coal price, washery operating costs, and washery yield. The formula is:

$$\text{W.C. Cost} = \frac{\text{Raw Coal Price} + \text{Operating Cost}}{\text{Washery Yield}} \quad \ldots\ldots (1)$$

If raw coal costs $4.30 per ton and operating cost in the washery is $0.20 per ton of raw coal handled, when the washery yield is 90 per cent the cost of washed coal will be $(\$4.30 + 0.20) \div 0.90 = \$5.00$ per ton. A little reflection will show that this will be true whether the washed coal contains 4 or 11 per cent ash. Of course, the two ash contents mentioned could hardly be secured from the same coal at 90 per cent yield in both cases. However, two different coals might give the same final washed coal costs, and the ash content would have no direct bearing on the subject.

2. *Functions of Washed Coal Ash*: It is proposed to relate a number of factors of prime importance in the calculations to the ash content of the washed coal. If this can be done satisfactorily it will simplify the method considerably.

Approximations suggested have certain theoretical justifications, plus the additional merit of meeting the test of matching actual operating data closely. It will be seen that actually only a narrow range of yield and ash need be considered for any given coal, and it is not necessary that the formulae apply exactly over the entire range used in the illustrations.

3. *Washed Coal Volatile*: In making comparisons at various yields and/or ashes seldom are exact and applicable figures available, and either a graphic or algebraic solution will have to be used to approximate the washed coal volatile. The following formula is suggested:

$$V_a = V_o(1\text{-}a) \quad \ldots\ldots (2)$$

where V_a is the volatile corresponding to an ash content of a, and V_o is the "ash-free" volatile.

For our 1944 practice the difference between the average volatile actually reported and the calculated volatile using equation (2) was only 0.1 per cent which is a close check.

4. *Oven Yield*: It is well known that the total coke yield will be more than the nonvolatile constituents in the oven charge. For our practice the best suited equation is of the form:

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$$\text{Total Coke Yield} = \text{Nonvolatile} + \frac{\text{Volatile}}{6} \quad (3)$$

This equation yields a result only 0.1 per cent different from our actual practice for 1944. The constant 6 will probably have to be replaced by some other constant for plants with different heating conditions and different types of coal.

5. *Coke Ash*: Obviously, the total coke ash is the quotient of washed coal ash and oven yield. The formula is:

$$\text{Coke Ash} = \frac{\text{Washed Coal Ash}}{\text{Oven Yield}} \quad \ldots\ldots\ldots (4)$$

Our coke is practically the same ash content as the breeze, the difference ordinarily being a matter of tenths of 1 per cent—consequently the formula is, for all practical purposes, exact when applied to our practice.

6. *Coke Price*: The price of coke is actually a function of washed coal price, oven yield of merchantable coke, operating costs at the ovens, and by-product credits. Following the usual custom in making comparisons we assume (?) that the net by-product credits will off-set the operating charges at the ovens. (Assume is almost a misnomer in our case. For 1944 the difference was less than 1 per cent). We make no allowance for breeze produced from the different coals, which greatly affects the price of coke through its reduction of marketable coke.

However, what shall we say about a noncoking coal used to improve coke quality? Considering such a coal on its merits as a coking coal the real coke yield is zero, and we are at an impasse. The only sensible thing to do is to bypass this yield question for the present and later justify the use of the coal by its effect on coke quality. If such a coal must be used the apparent cost has no particular bearing on the subject, except that it might be possible to do the same thing more economically with another coal.

It is not believed that attempts to be exact in determining the yield of furnace coke, by-product credits, etc. will greatly increase the efficiency of the comparisons in the usual case; but if sufficient data are available to afford more useful figures there is certainly no reason for not using them.

Coke price will then be determined by the following formula:

$$\text{Coke Price} = \frac{\text{Washed Coal Price}}{\text{Oven Yield}} \quad \ldots\ldots (5)$$

By the use of the five foregoing equations or formulae the price of coke per ton, as well as its ash content can be determined for any washery yield and washed coal ash content.

Illustrative Example: Coke ash and coke price can be calculated for a given coal at any combination of washery yield and washed coal ash in the form shown in Table I. The illustration uses the washery yields of 84 and 94 per cent only, for we are primarily interested in yields between these limits for reasons which will be developed later.

TABLE I—Coke ash and coke price for various washed coal ashes at different washery yields

Washed Coal		Coke		Coke Price	
Ash, %	Vol. %	Yield, %	Ash, %	84%	94%
7.0	33.12	72.18	9.70	$8.164	
7.5	32.95	72.32	10.37	8.149	.....
8.0	32.77	72.47	11.04	8.132	.....
8.5	32.59	72.62	11.70	8.115	.....
9.0	32.41	72.78	12.37	8.097	.....
9.5	32.24	72.92	13.03	8.081	$7.222
10.0	32.06	73.07	13.69	8.065	7.207
10.5	31.88	73.22	14.34	8.048	7.192
11.0	31.70	73.37	14.99	.....	7.177
11.6	31.52	73.52	15.64	.....	7.163
12.0	31.35	73.67	16.29	.....	7.148
12.5	31.17	73.82	16.93	.....	7.134
13.0	30.99	73.97	17.57	.....	7.119

For Coal "A", the delivered price is $4.75 per ton, the washery operating costs $0.20 per ton, and the ash-free volatile 35.62 per cent.

Data in Table I show that as the washed coal ash increases, the volatile decreases, the coke yield increases and the coke ash is much increased, the increase being greater than that in washed coal ash in spite of the increase in yield. However, as the coke yield increases the price of coke decreases for any specified washery yield. For any given washed coal ash the coke price decreases as the washery yield is increased. All this ties in with operating experience, as it should.

All the necessary calculations have been made to complete the required information on coke plant effects. The actual use of Table I is considered later, at which time it will be seen that only the extreme yields need be used.

Factors at the Blast Furnace: In general, it may be said safely that with a constant ore charge:

1. Increased coke ash requires the use of additional limestone which, in turn, produces additional slag which requires more coke, etc.

2. Increased coke requirements per ton of pig iron means less production per furnace day, and

3. Decreased production means increased overhead.

Calculation then is reduced to three quantities, as follows:

1. Amount of coke per ton of iron, and its cost.

2. Amount and cost of limestone for coke.

3. Amount of increase in overhead above that for ash-free coke.

If this can be done with a reasonable degree of accuracy, all the necessary information will be at hand for assembling what may be termed the "Fuel Cost per Ton of Pig Iron" for any combination of washed coal ash and washery yield.

For the calculation of coke per ton of pig iron, a modification of the usual formulae is used:

$$\text{Pounds Coke Per Ton of Pig Iron} = \frac{1.320}{\text{F.C.}}\left(1 + \frac{0.765\ \text{Ash}}{\text{F.C.} - 0.765\ \text{Ash}}\right) \quad \ldots\ldots (6)$$

Constants used in this formula are based on normal operating practice and the use of average quality materials at our furnaces. The constants would not be the same for any two plants, except by the vagaries of chance. Scott[1] gives the necessary information for determining the necessary constants for any particular situation.

A graphical solution to equation (6) is given in Fig. 1 for the range from 0 to 20 per cent coke ash.

The amount of limestone required for coke is a function of the amount of coke per ton of pig, the ash of the coke, and the quality of the slag and limestone. The cost is equal to amount times price. Under our operating conditions, each pound of coke ash will require 1.25 lb of limestone, at a price of $1.50 per ton of stone. The formula for stone cost is therefore:

$$\text{S.C.} = \frac{1.25 \times \text{Coke} \times \text{Ash} \times \$1.50}{2000} \quad \ldots\ldots (7)$$

and other constants would have to be used for different operating conditions.

Effect on overhead costs is due to decreased production of iron as the amount of coke per ton of iron increases, since the furnace will burn approximately the same amount of coke per day. We have modified this slightly by taking into consideration only the "excess" overhead due to the decrease in production below the theoretical figure for ash-free coke. In our case this excess overhead reduces to:

$$\text{E.O.} = (\$0.0014 \times \text{Coke Per Ton}) - \$1.848 \quad \ldots\ldots (8)$$

the two constants being subject to individual determination as operating conditions dictate.

For convenience, the items of lime-

stone and overhead may be combined into a single figure designated "Other Fuel Costs" or "Fuel Costs Exclusive of Coke." This, added to the cost of coke gives the "Fuel Cost per Ton of Pig Iron." The "Other Costs" may be calculated for any range of coke ash and plotted graphically to facilitate interpolation. Such a chart is illustrated in Fig. 2.

Fuel Cost Per Ton of Pig: The method for determining the ash content and price of coke made from our coal at any washed coal ash content and washery yield, as well as the two charts which can be used to determine the amount of coke required per ton of pig iron and the "Other Costs" due to limestone and overhead, permit the computation of the "Fuel Cost" as a function of washery yield and washed coal ash.

Example, Coal "A": The following data are taken from Table I:

Washed coal ash, %	10.0
Coke ash, %	13.69
Coke price, $:	
At 84% washery yield	8.065
At 94% washery yield	7.207

From Fig. 1, we find that we will require 1740 lb of coke which has an ash content of 13.69 per cent. From Fig. 2, we find that the "Other Costs" will be $0.83.

For 84 per cent yield and 10 per cent ash, the fuel cost per ton of pig iron will be:

$$\frac{1740 \times \$8.065}{2000} + 0.83 = \$7.85$$

and for 94 per cent yield and 10 per cent ash, the fuel cost per ton of pig iron will be:

$$\frac{1740 \times \$7.207}{2000} + 0.83 = \$7.10$$

This indicates that a 10 per cent decrease in washery yield, with the washed coal ash constant at 10 per cent would cost $0.75 per ton of pig iron. It would be concluded that we could expect a 1 per cent decrease in washery yield to increase the fuel costs $0.075 per ton of pig iron, if the washed coal ash remained constant.

It must be remembered that when coal is washed there is usually a drop in ash content as the yield is reduced. With a 1 per cent decrease in yield the ash decrease might possibly be as much as 0.5 per cent. If the ash content of the washed coal were only 9.5 per cent, what would the fuel costs be?

Table I and Figs. 1 and 2, give the following data:

Washed coal ash, %	9.5
Coke ash, %	13.03
Coke price, $:	
At 84% washery yield	8.081
At 94% washery yield	7.222
Coke required, lbs	1.715
Other costs, $	0.78

"SKY-HIGH" HANDLING SYSTEM: This 80-ft 7-ply fabric lift belt carries a daily production of 1500 tons of sand and gravel at the Rubber City Sand & Gravel Co., Akron. Powered by a 40-hp motor, the belt, installed by Goodyear Tire & Rubber Co., operates on 268-ft centers and achieves lift on a 30 per cent grade. Entire layout uses approximately 1700 ft of 24-in. belting

For 84 per cent yield, the fuel cost per ton of pig iron will be:

$$\frac{1715 \times \$8.081}{2000} + \$0.78 = \$7.71$$

For 94 per cent yield, the fuel cost per ton of pig iron will be:

$$\frac{1715 \times \$7.222}{2000} + \$0.78 = \$6.97$$

The difference between the fuel costs corresponding to 10 and 9.5 per cent washed coal ash at 84 per cent yield is $0.14, and at 94 per cent yield it is $0.13. In this area of yield and ash it would appear that a 1 per cent decrease of ash in washed coal is worth about $0.27, if there is no change in washery yield. But, due to the fact that the yield probably will not remain constant we must obtain the "resultant" of the two effects to get the correct answer, and it appears that the net gain due to reducing ash 1 per cent at the expense of reducing washery yield by 2 per cent would be about $0.12 per ton of pig iron.

Costs Are Counterbalanced

As we move from the area of "normal" washery operations we arrive at a point where the decreased furnace costs due to ash elimination are more than counterbalanced by the increased cost of coke due to decreased washery yield. It might also be suspected that there is a limit to the benefits to be derived from increased washery yield, which will be accompanied by a rapid increase in ash as we approach the upper limit of 100 per cent recovery.

The fact of the matter is that to show the true relationship it is necessary to combine three factors on one chart. This can be done by calculating the fuel costs for a series of washed coal ashes at a low washery recovery and also for a high washery recovery. These costs may be plotted against washed coal ash at the selected recoveries on a scale sufficiently large to permit easy interpolation. Such a chart is shown in Fig. 3, for Coal "A." This is valuable information; but not complete nor in readily useful form.

To make the information complete, let us take a chart which uses washed coal ash and washery yield as co-ordinates and plot thereon the fuel costs determined from Fig. 3 as contour lines. These are shown on Fig. 4. Theoretically there is a slight upward curvature to these contour lines; but over the range in which we are interested this does not amount to more than a $0.01 deviation from the straight lines as shown.

It is now possible to determine the fuel cost for any combination of washed coal ash and washery yield (within the limits of our calculations). It is an interesting chart inasmuch as it combines all elements of our analysis so that no more calculations are necessary. It is a complete solution of our equation of fuel cost per ton of pig iron. What does it mean?

Let us superimpose the washability (float-ash) curve for the coal in question, which will give us the theoretical relationship between ash and yield. This is shown on Fig. 5. Note that the curve crosses the fuel cost contour lines, and reaches a minimum at about 8 per cent ash and 86.5 per cent yield, and as we move along the curve, in either direction, the increase in fuel cost gradually accelerates. A decrease of 1 per cent ash

will cost more than an increase of 1 per cent ash, demonstrating that it might be an expensive experiment to wash coal too clean, even with a perfect gravity separation. What happens in an average washery?

Fig. 6 adds the "Expected Products" curve to the information shown on Fig. 5. It is apparent that we cannot reach the theoretical minimum fuel cost shown by the feed curve in actual practice, and that any attempts to reduce fuel costs by reducing ash become increasingly futile after a certain point is reached. If we had a more efficient washery we could probably reduce our fuel costs considerably, for there is plenty of room between the feed curve and the products curve.

Applications of the System: It is believed that by use of a set of charts as presented herewith the problem of attaining maximum "efficiency" in the washery can be approached more intelligently than by any other system.

As long as the cost of raw coal remains about constant, it will be possible to compare the fuel cost from month to month as coal quality varies slightly. This will prove a valuable aid in determining whether or not more elaborate blending or selective mining is in order.

It is possible to make comparisons of fuel costs when a coal is washed by various types of equipment, if the efficiency characteristics and operating costs of the process are known. For this purpose charts such as Fig. 6 are far superior to previous methods.

How Values Are Judged

One may compare the minimum fuel costs of different coals and thus have a sound basis for judging their relative values. High cost coals would be eliminated from the mixture as rapidly as possible. As an example of the differences that may be found, the fuel cost vs. washed coal ash (normal washery practice) is plotted for several of our coals and shown on Fig. 7. Obviously something should be done, and it is being taken care of as rapidly as circumstances will permit.

For unwashed coals the calculations are simpler, and the results would plot as points on Fig. 7 instead of the curves shown for the washed coals.

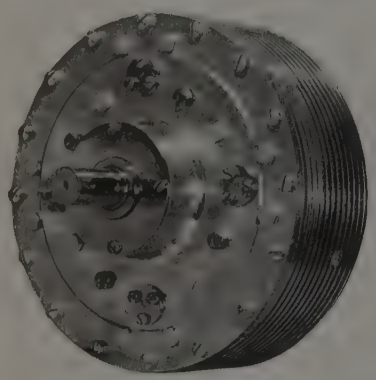
Conclusion: It may seem to some that a number of assumptions have been made that are not fully warranted by the facts of the matter. It is admitted that there is no way of proving that these fuel costs are rigorously correct; but it is submitted for consideration that there are few costs that are determined with the precision the accountant would like to have us associate with his cost sheets. The best we can ever hope for is a workable approximation to the truth, and since all coals are treated alike in this analysis there is little room for doubt as to the validity of our conclusions, so far as ash is concerned.

The effect of sulphur calls for additional consideration, as noted at the start. So, also, do the effects of coals used primarily for the improvement of the physical properties of the coke; but we do have a means of determining whether or not a coal has "two strikes on it before it gets to bat."

(1) "Coal Washability Tests As A Guide to the Economic Limits of Coal Washing," AIME, Technical Paper 159, 1929.

This paper was presented before the meeting of the Blast Furnace and Coke Association of the Chicago District, Del Prado hotel, Chicago, March 26. It was awarded first prize in the coke oven section of the fifth annual technical papers contest sponsored by the association.

Clutch and Speed Control DRIVE



TREMENDOUS shocks transmitted through the gear train to engines of extremely high horsepowers are cushioned through use of a compact clutch and speed control drive currently being produced by Brad Foote Gear Works, Chicago. The unit, designed for use on machine tools, maritime hoists, truck tractors, utility drives and other power-transmission installations, not only cushions shock but, through its compactness, also facilitates its installation on any unit between the driver and driven member.

According to Brad Foote, the unit does not generate excessive heat due to its hydrostatic principle which balances the demand load without friction, and it is not necessary to employ any open ports for cooling, or other devices to maintain its normal thermal rating.

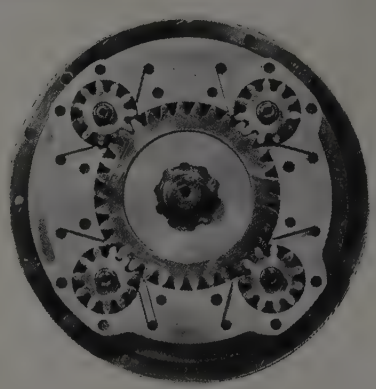
Machine breakages resulting from shock are prevented by a torque overload device incorporated in the drive, the shock being taken up by the fluid, it is said.

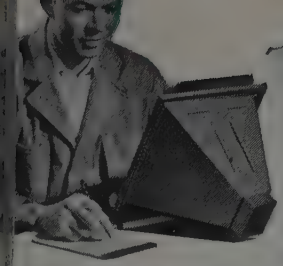
Development, called the Speed Flo drive, is shown at left. It consists of four planetary gears and a sun gear. Latter is attached directly to the output shaft as shown at right. Each planet gear in combination with the sun gear forms a hydraulic pump. Reservoir embodies oil, valve seat, valve and air.

Rotation of the engine causes the rotation of the clutch housing. As engine idling speed is above 300 rpm, oil forms an annulus in reservoir with air in the center. When clutch is disengaged valve is so constructed as to baffle oil, and planet gears rotating about sun gear pump air from center of reservoir, discharging it back into center of reservoir.

As clutch is engaged by an axial movement of valve, both oil and air are allowed to enter into the pumps. At the same time valve movement starts to close off discharge of pumps, thereby creating a hydrostatic pressure against sun gear.

When clutch becomes fully engaged, valve allows free oil to enter pumps, and discharge port is completely closed, creating maximum pressure against sun gear. Clutch is designed to transmit maximum torque of engine, causing motion of vehicle during engagement of clutch. By controlling valve in hydraulic clutch with a centrifugal governor, a hydraulic speed control is provided.





Your radiographer has the facts . . .

Your cost accountant the figures, to show

. . . what Radiography does for profits

With facts and figures on your own operations before you, you can determine what you are being repaid for every dollar you invest in x-rays.

Facts and figures are worth running down . . . How many dollars do you save when radiographic inspection keeps internally unsound parts out of your machine shop? How much money would you lose if parts were rejected due to irregularities uncovered during costly machining? A review of your operations should show you how radiography more than pays for itself.

You can put a dollar sign on the gains made by radiography in many other ways . . . improved design . . . less weight . . . more economical fabricating methods . . . salvage of castings through repair welds.

Why not review these facts now in your own plant . . . just when you need increased production and lowered costs? Your x-ray laboratory or local x-ray dealer will be glad to help. Or write to

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Radiography

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INDUSTRIAL EQUIPMENT

Self-Locking Nut

Gripco lock nut, manufactured by Grip Nut Co., 308 South Michigan avenue, Chicago, is a semifinished, one-piece, self-locking nut of standard dimensions, not affected by oil, water or chemicals. Use requires a wrench but no lock washers or cotter pins.

The patented triangular deflections on top of nut provide a controlled friction lock. Nut is free-spinning until bolt threads contact deflected threads near top of nut. Tests prove that the nut can be applied and reapplied many times without appreciable loss of locking power.
Steel 7/15/46; *Item No.* 9254

Thread Roller

A Reed No. A22 cylindrical-die thread roller capable of producing uniform threads, knurls, serrations and other types of formed and burnished surfaces on diameters of ¼ to 2⅝-in. and thread lengths up to 1½-in. is a product of Rolled Thread Die Co., 237 Chandler street, Worcester

2, Mass. It will perform on a variety of metals ranging from soft nonferrous to semihard alloy steels.

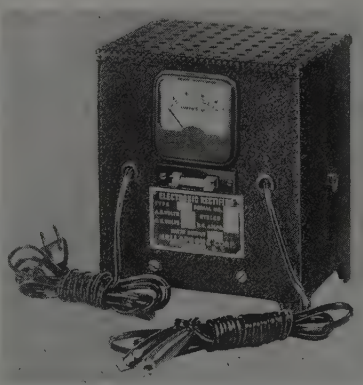
Work blank is supported and positioned vertically between three synchronously rotating cylindrical dies. Adjustable scroll rings in head allow approximate setting of dies, while final sizing of work is obtained by micrometer adjustment. Adjustments may be made for diameter, length and taper.

Machine is manually loaded and continuous in operation. Oscillating head has sealed ball and roller bearings. Each die has an individual coolant supply.

Die speeds may be varied through standard change gears from 110 to 720 rpm. Cam speeds may be either 6, 11, 16, 21, 26 cycles per minute with standard change gears. Unit is powerd by a 220, 440 or 550 v, 7½ hp 1800-rpm motor.
Steel 7/15/46; *Item No.* 9533

Battery Charger

Battery charger for charging 6-v batteries is announced by Mellaphone Corp., Rochester, N. Y. Using selenium plates as rectifying elements, unit is rated to



charge at 8 amp and will stand an overload without harm.

An ammeter indicates rate of charge and assists in getting charger connected. A fuse gives protection against shorted batteries. Entire charger is housed in a ventilated steel case ready to plug into any 110 v 50/60 cycle outlet.
Steel 7/15/46; *Item No.* 9494

Milling Cutters

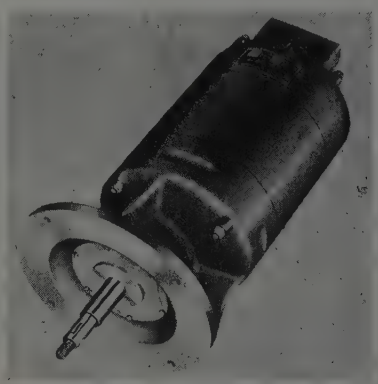
Inserted blade carbide face mills for milling steels are announced by Tungsten Carbide Tool Co., 2661 Joy road, Detroit. Use of inserted round steel blades with thick carbide tips for strength and wedge-locked into cutter body, has made possible designing cutter body without external slots, eliminating tendency to give, and imparting a degree of rigidity approaching that of a solid cutter.

Called the Vibra-Cushioned cutter, it has extra weight distributed to give the maximum flywheel effect. Ability to resist vibration and stepless adjustment which eliminates grinding of carbide to equalize blades are features of the cutter.

Left and right hand cutters with 6, 8, 10, and 12 in. diameter with 8, 10, 12 and 14 blades, respectively are offered.
Steel 7/15/46; *Item No.* 9615

Gear-Motor

A new gear-motor developed by Electrical Engineering & Mfg. Corp., 4606 West Jefferson boulevard, Los Angeles, is a special, fan-cooled, open-type, 2-pole 3600 rpm unit, with output speed stepped up to 8000 rpm by single-reduction helical gears in a sealed gear box. Motor is small, light, and compact. Motor



of same design, with changed gear specifications, fits a variety of applications requiring output speeds not ordinarily obtainable with commercial current.
Steel 7/15/46; *Item No.* 9364

Crane Safety Limit Stop

A weight operated type safety limit stop to prevent crane overtravel in hoisting direction is announced by Electric Controller & Mfg. Co., 2700 East 79th street, Cleveland. For use on either alternating or direct current crane-hoists, it

is adaptable for use on small or medium-capacity cranes.

Identified as model No. 10-W, it is weight-operated in both tripping and resetting directions. As suspended weight is raised by crane hook block, the weight operating arm causes limit stop to transfer from run position to tripped position.

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 136.)

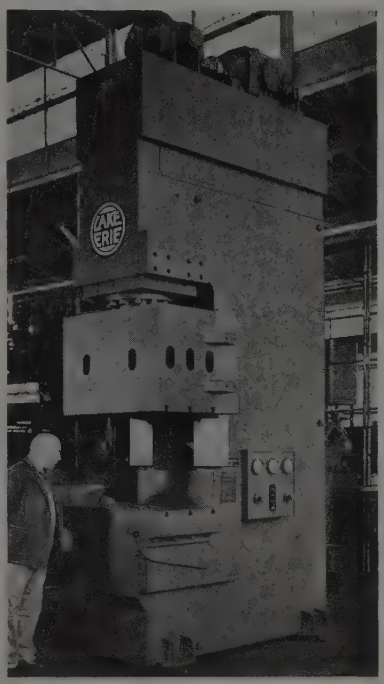
Lowering hood block lowers weight and automatically resets limit stop.

Suspended weight has a split bakelite bushing for ease of installation around hoist cable on standard cranes. Special guides may be bolted or welded to steel weight for multiple-reeved crane blocks.

Limit stop is rated at 40 hp, 230 v direct current, and 50 hp, 220 v and 75 hp, 440 or 550 v ac.
Steel 7/15/46; *Item No.* 9376

Hydraulic Press

Illustrated is compact 200 ton C-frame hydraulic press built by Lake Erie Engineering Corp., 500 Woodward avenue, Buffalo 2. According to manufacturer press has 42 by 24 in. die space, 30 in. daylight opening, 16 in. stroke and clos-



ing speed of 350 fpm. Upper platen is rigidly guided for strength and accuracy.

Operation is by hand lever, and sensitive control of operating speed is by direct stroking of pump.
Steel 7/15/46; *Item No.* 9410

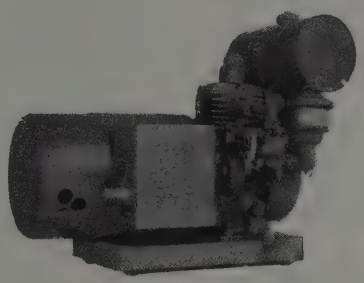
Drill Size Pin Gages

Complete sets of either numbered, lettered or fraction type drill size pin gages are announced by Horberg Gage Co., 19 Staples street, Bridgeport, Conn. Twin gages of each size are held upright in a modern, shop-tested case, clearly identified for quick selection.

Gages are made to tolerances of plus 0.0001, minus 0.0000-in., of oil hardened tool steel and tapered half-way up shank for easy insertion. All gages have round, polished top and flat, ground bottom.
Steel 7/15/46; *Item No.* 9397

Power Plant

Kato Engineering Co., Mankato, Minn., is manufacturing a 110-v 500-w 60-cycle alternating current power plant powered by a 1 hp single cylinder Briggs & Stratton gasoline engine. Compact,

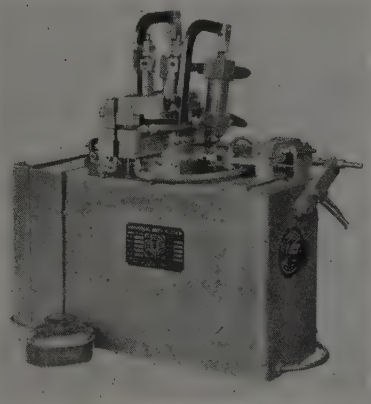


portable (weighs 125 lb), unit is suitable for standby service or continuous operation.

Designated as model 23HAB4, unit has self-excited generator bolted directly to side of engine crankcase. It has a push-button on generator with cutout, direct-current ammeter, charge-control resistor and cables for connection to 6-v auto type battery for starting.
Steel 7/15/46; *Item No.* 9470

Butt Welder

Universal Welder Corp., 755 Carnegie avenue, Cleveland 15, is manufacturing a new line of hand and air-operated midget butt welders. These bench model welders are offered in 10 kva and 20 kva with either hand or air operated



clamps and with hand or air operated push up features.

Manual type machines afford a welder capable of welding intermittently up to ½-in. round steel and larger for infrequent use. Air-operated push up units are designed for wire butt welding at rates of production up to approximately ¼-in. steel. They are adaptable for fabricating small steel molding strips.

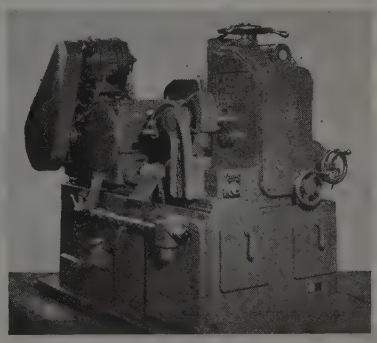
Air operated units are equipped with a foot switch that start cycle by clamping weldment, followed automatically by completion of heating, weld, push up and release of welded part.
Steel 7/15/46; *Item No.* 9540

Metal Sawing Machine

Motch & Merryweather Machinery Co., Penton Building, Cleveland is announcing a new No. 2 metal sawing machine capable of cutting ferrous and nonferrous metals to 6 in. round, square or multiple stock or up to 12 x 5 in. standard I-beams.

Offered with four blade speeds, its main drive is through a multiple-disk clutch running in oil. Work is clamped hydraulically on both sides of saw by an interlock between clamp and feed which will not allow saw to feed into loosely held stock. Maximum saw blade diameter which can be used is 22 in.

Alloy steel spur gearing in saw blade drive is designed for loads in excess of



any encountered under heavy sawing conditions. Other features are anti-friction headstock, single-lever control of feeding and provision for fully automatic stock feed.
Steel 7/15/46; *Item No.* 9384

Coil Tester

Magneto coil tester which gives a high-potential running test to six coils simultaneously without necessity of assembling each coil separately into a regular magneto is announced by General Electric Co., Schenectady, N. Y. It is designed for routine factory testing of coils and also for laboratory testing.

Behind glass windows at top of tester are six spark gaps in a sound-proofed ventilated compartment. Upper grounded electrode of each spark gap is attached

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 136.)

to a threaded, knobbed rod which is used to make adjustments. Next to rod is a scale calibrated from 10 to 45 kv.

Below spark gaps on instrument is control panel, consisting of filament and power swiches, an overload circuit breaker, two tap switches giving 2 per cent

steps in input voltage, a frequency switch providing five steps from 100 to 500 sparks per second, and individual disconnecting switches for each coil. Below control panel is coil compartment with an interlocked glass door. Two full-length doors give access to interior.
Steel 7/15/46; *Item No.* 9539

Fog Nozzle

A new fog-producing fire nozzle for fixed installations is announced by Sprinkler Division of Blaw-Knox Co., Pittsburgh for use in connection with its various fire-control systems. Named the Aquatomic fog nozzle, it is adapted to protection of tanks containing inflammable liquids.

Fog is produced by forcing water through three clear spiral passages and a clear central passage in head of nozzle. No internal obstructions impede the free flow of water. Fog pattern is maintained even at greatly reduced water pressures. Air currents, whether external or internal, do not affect its action.
Steel 7/15/46; *Item No.* 9269

Skids and Jacks

A new line of semi-skids and jacks is announced by Market Forge Co., Everett, Mass. Unit is entirely of steel with a high

tensile steel deck. Semi-skid is completely fabricated and arc-welded and is designed so that it may be used with hand or power lift truck. Wheels are 8 in. in diameter and are mounted on roller bearings with hardened inner races.

Skid jack itself is equipped with two 8 in. diameter wheels mounted on roller bearings with a hardened axle. A hook arrangement allows load to be easily lifted even when heavily laden. More than 1 in. of lift is provided for front legs, allowing it to travel over ordinary obstructions. All-steel, light-weight box sections of nesting type can also be furnished to retain loads.
Steel 7/15/46; *Item No.* 9526

Safety Goggle

A safety goggle with a molded plastic frame that resists breakage, provides good ventilation and reduces fogging is offered by Watchemoket Optical Co. Inc., Providence, R. I.

The frame is roomy and comfortable for wear directly over many styles of prescription glasses. Called the model 1-N, it also gives extra protection against injury from top, sides and bottom.
Steel 7/15/46; *Item No.* 9343

Heavy Duty Relays

Bulletin 130 relays designed for heavy duty industrial and electronic applications such as light contactor duty, control of single phase motors and other remote or automatic control purposes are being manufactured by Ward-Leonard Electric Co., Mt. Vernon, N. Y. Offered are contact arrangements from 1 to 4 poles, normally open or normally closed, single or double throw. Oper-

ating voltages for direct current relays are from 6 to 230 v and for alternating current from 6 to 440 v.

Standard relay features are molded

This fine-tooth saw delivers maximum cutting-life on work requiring a fine pitch or specially smooth cut. Double-lap construction, with teeth-segments secured *and aligned* in place by 5 rivets, gives greatest tension and torsion strength . . . and makes the saw run true, *without vibration or chatter,* under the highest cutting pressure. Special tooth-design channels the coolant right to the cutting edge, so that dulling from friction-heating is long deferred. And even when teeth do dull, the segments are quickly and easily replaced. Order Simonds Segmental Saws from your Industrial Supply Distributor, or get in touch with the nearest Simonds office, listed at the right.

...to give you Extra Cutting from

SIMONDS

SEGMENTAL Metal-Cutting Saws

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S.W. First Avenue, Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington. *Canadian Factory:* 595 St. Remi St., Montreal 30.

SIMONDS SAW AND STEEL CO.

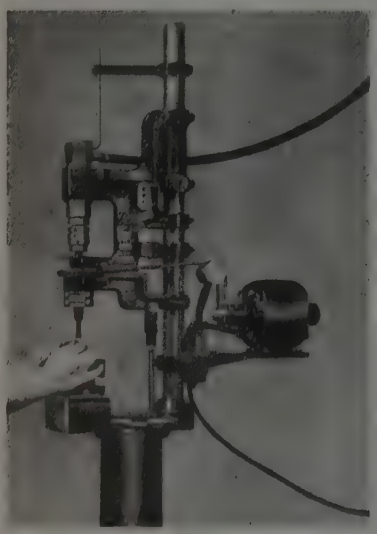
FITCHBURG, MASS.

PRODUCTION TOOLS FOR CUTTING WOOD, METAL, PAPER, PLASTICS

phenolic bases, accessible front connected terminals and corrosion resistant finishes on all metal parts. All sizes employ silver to silver contacts. Relays are manufactured with mechanical interlocks for reversing service and with mechanical latches for manual or electrical.
Steel 7/15/46; *Item No.* 9394

Spinner Riveter

The Keyn Airflex, a new spinner-riveter for all types of cold headed assemblies is especially adaptable for use in assembly work on fragile materials. Feature of the spinner-riveter, announced by Plymouth Engineering Co., Ply-



mouth, Ind., is its adjustable spindle regulator for controlling riveting force under maximum speed.

In operation, narrow faced tool of riveter is rotated while a pneumatic hammer strikes a series of rapid blows. Rotation of tool spreads the peening over entire surface of riveted head, pressure being confined to rivet only.

Riveting hammers are interchangeable for different sizes of rivets. Piston diameters of ½ to 1½ in. handle work up to ½-in. diameter.
Steel 7/15/46; *Item No.* 9362

Pneumatic Press Unit

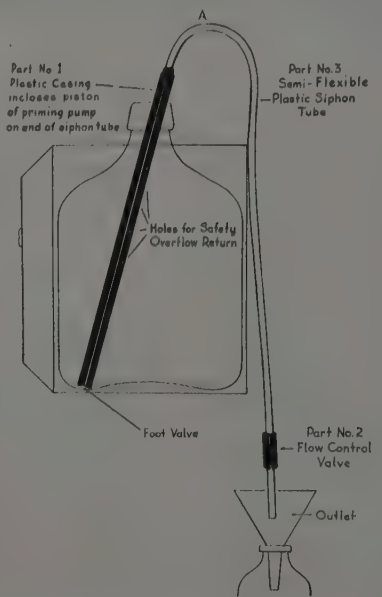
National Pneumatic Co., 420 Lexington avenue, New York, is introducing a packaged pneumatic equipment unit that, when installed on any kick press, converts it to power operation. Unit is composed of an air engine of 270 lb rated power, delivered at 100 lb air pressure, a foot-operated control valve piped to two flexible hose connectors, a speed adjusting fitting, to control speed of engine stroke in both directions, a cut-off cock for shutting off air to unit and an air strainer to be placed in air supply line.

If desired, two hand-operated control valves may be substituted for foot con-

trol valve, an additional safety factor as press operator must employ both hands—eliminating any possibility of tripping press while hands are in an unsafe position. Work quality is improved as every stroke of press is delivered at same uniform power.
Steel 7/15/46; *Item No.* 9399

Siphon

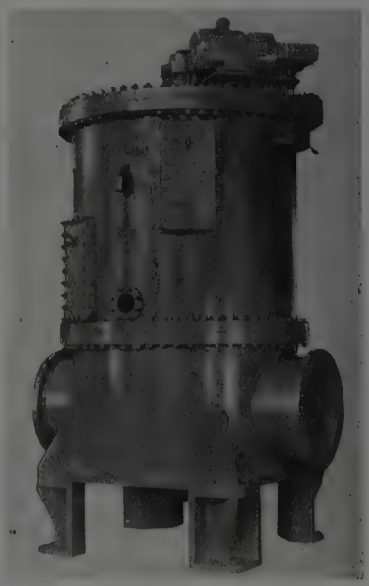
A siphon made of an inert plastic is announced by Alden Speare's Sons Co., Cambridge, Mass. Designed primarily for safe and efficient handling of acid, it is used to draw acid from carboys of from 5 to 13 gal inclusive, and also from side bung of 50 to 55 gal drums.



Siphon is quickly primed by a built-in pump. Entire contents of carboy may be discharged by siphon by manipulation of the flow control valve which may be adjusted from a tiny trickle to a fast steady flow. Plastic is unaffected by practically all grades of commercial acid, alcohols or water.
Steel 7/15/46; *Item No.* 9352

Water Strainer

A strainer which will remove fine suspended particles from raw or process water and dispose of them in a con-



tinuous, automatic self-cleaning manner is announced by S. P. Kinney Engineers Inc., 233 Oliver avenue, Pittsburgh.

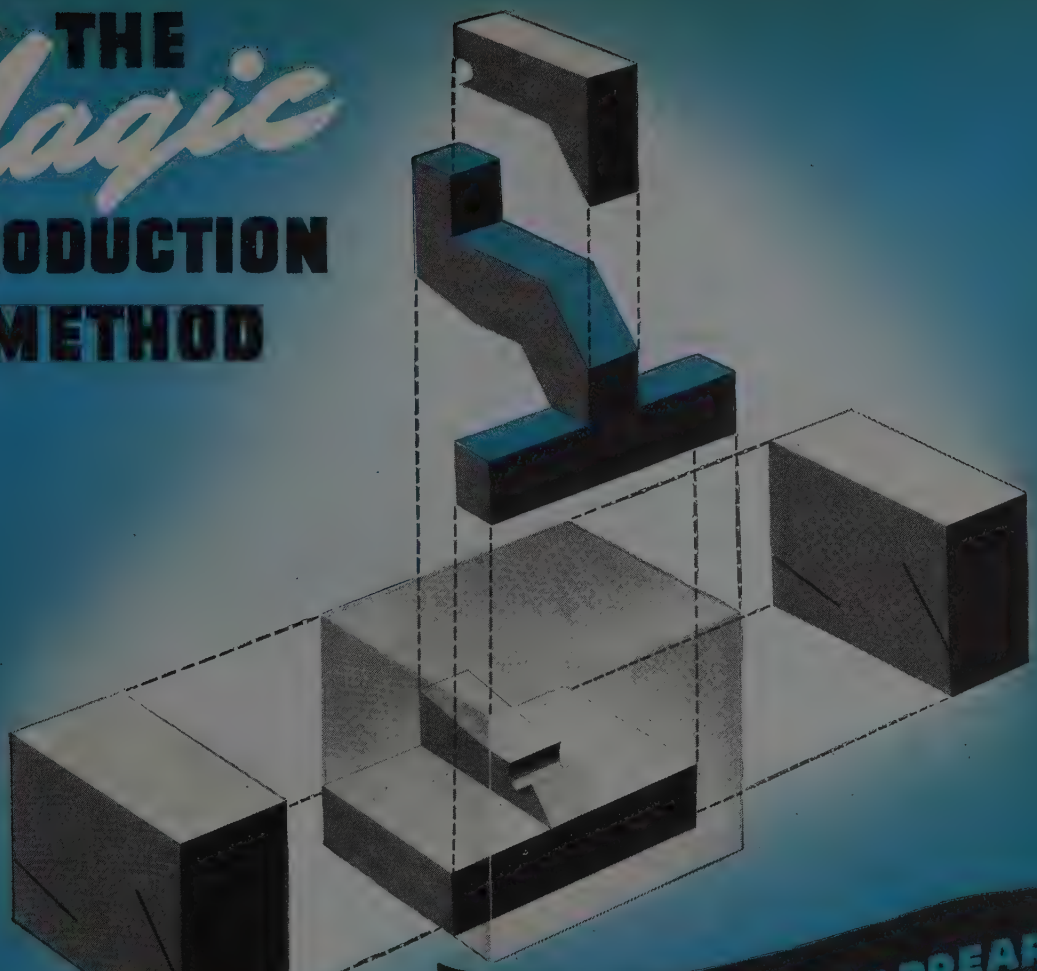
Strainer consists of a rotating conical drum, the entire surface of which is drilled to receive straining media which consists of porcelain disks or flat or conical wire stainless steel screens. Drum is mounted on a vertical shaft within a cast iron housing.

Strainers for river, lake, canal, or well water are equipped with chrome-nickel body, cover and drum casting, stellite bushing and stainless steel pinion. Bronze ring gear, liners and straining media retainer rings are used. For sea water, all parts are of corrosion-resistant metals.

Strainers are offered in sizes from 3 to 30 in. pipe line sizes with capacities varying with size of strainer, type of straining media used and orifice size of straining media.
Steel 7/15/46; *Item No.* 9387

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 136.)

THE *Magic* PRODUCTION METHOD



FINISHED PART "APPEARS"
27 MINUTES BY CONTOUR SAWIN
(8 HOURS BY OTHER METHODS)

Contour Sawing is the *world's fastest metal removing pr cess*. Hundreds of sharp, hard tool points on endless ban "slice" off unneeded metal — no slow "whittling" to worthle chips. Continuous cutting; no backstroke or lost motion. Appre tice can cut accurately within .005".

Above 3-dimensional part, contour-sawed on a DoALL Royal Typewriter Co. Hartford, Conn. Countless other jobs a similarly produced from stock instead of being cast or forged an machined by ordinary methods. All metals, even tough allo steels, a foot or more thick, are precision cut on a Contour Sa

Amazing advantages of Contour Sawing are pictured in fre booklet *"DoALL Equals Ten Plus"*. Write for a copy to fin out about real production economies.

The DoALL *Company*

DoALL STORES
IN PRINCIPAL CITIES

MACHINE-TOOL DIVISION
MINNEAPOLIS 4, MINN

Selecting the Right Motor

(*Continued from Page* 100)

that class 2 motors should not be used on applications with frequent starting and stopping.

One way to reduce excessive heating in the rotor of a squirrel-cake induction motor when accelerating an extremely high inertia load is to make use of a multi-speed motor. These multi-speed motors have two, three or four running speeds depending upon the design of winding. Any primary winding can be arranged for a regrouping connection which gives two fixed speeds, one is half the other. It also is possible to wind two separate windings on a stator and by regrouping this second winding to get a total of four speeds.

By going through the proper sequence of operation of starting on the low speed winding and successively transferring from one winding to the other up to maximum speed, a motor can accelerate a given inertia with only 25 per cent of the rotor loss if the motor load were accelerated with a single speed motor. Comparison of heating is shown in Fig. 5. The multi-speed motor is also very effectively used in decelerating a load by transferring from high to low speed winding in sequence. It is a much more efficient and definite way of slowing down a squirrel-cage motor than by plugging.

Use of alternating current commutator motors is somewhat limited because of poor commutation, but on single-phase supply lines the repulsion motor is often used for accelerating high inertia loads. With this type motor as with direct current motors heating in the rotor is small on acceleration and presents similar characteristics to a variable frequency system. These losses are illustrated in Fig. 8.

For the largest group of applications as represented by fans, pumps, compressors, conveyors, etc. which are started and stopped infrequently and have low inertia loads so that the motor can accelerate in a few seconds, the conventional general purpose motor can be used. If the motor is installed at a location where there is limitation on the starting current the class 1 motor can be used. Or if the current is still in excess of what can be permitted then reduced voltage starting is employed. On those applications where reduced voltage starting does not give sufficient torque to start the load with either general purpose or class 1 motors, the class 2 motor with its high inherent torque along with reduced starting current supplied in combination with reduced voltage starting will solve the problem.

Drives for large fans, once they are accelerated run continuously at full load, and therefore it is desirable to have the best possible efficiency and power factor. Some of the fans, however, have extremely high values of WR^2; motors with normal starting torque characteristics may require from 30 sec to 1 min to accelerate. With starting current flowing in both rotor and stator for this long period of time sufficient heat may be generated to damage the rotor winding which will get so hot that the bars and rings will warp and bend and eventually crack and break.

To meet this application with a squirrel-cage motor a special class 1 motor is used to reduce the starting current to a minimum. Rotor of the motor is designed with a large mass of material, especially in the end rings so that it is possible for the motor rotor to absorb tremendous losses during the accelerating period without reaching excessive temperatures. Once the motor reaches its full load speed the losses return to normal and the rotor rapidly cools down to its normal operating temperature.

Another continuous running motor application which needs individual attention is on drives where there is high external inertia quite often in the form of a flywheel, and where the load instead of being of a continuous full load torque is pulsating in nature. Typical examples of this application are presses and bolt headers. No work is being done for the majority of time and then a peak load occurs which may require torques many times the full load torque of the motor. Under these conditions running efficiency of the motor at full load is not important because it never operates at that point, and therefore the motor is deliberately designed with more than normal secondary resistance so that it has a tendency to slow down as the load comes on the drive.

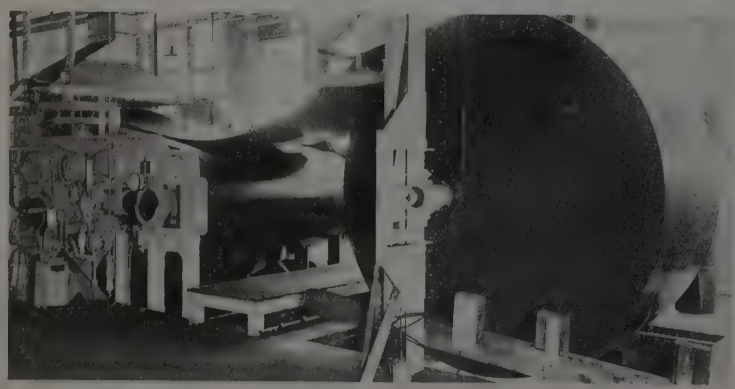
Flywheel Gives Up Energy

This tendency for the motor to slow down permits the flywheel to give up energy to absorb the peak load with the motor exerting no more than full load torque. However, the energy that is taken out of the flywheel during the work stroke must be returned to it by the motor, and therefore the motor must have sufficient torque to accelerate the flywheel before the next work stroke is made.

Since presses work at widely varying rates, say from 2 or 3 work strokes per minute to as high as 100 to 150 work strokes per minute correct amount of rotor resistance will vary depending upon the number of strokes per minute made. On the extremely large presses making only a few strokes per minute there is ample time for the flywheel to slow down 10 to 15 per cent during the work stroke and to give up a considerable part of its kinetic energy. Therefore, motors used on this type of press should have 8 to 13 per cent slip.

As the number of strokes per minute increases, the length of time of the working stroke decreases, and there is not much time available for the flywheel to slow down, nor is there much time for the motor to reaccelerate the flywheel between strokes, so that the amount of slow-down of the flywheel is usually between 5 and 10 per cent. Standard line of press motors with 5 to 8 per cent slip has been designed for this application. These presses usually make in the neighborhood of 10 to 40 strokes per minute.

On the smaller presses making 100 to



CONTINUOUS VULCANIZING: Conveyor belt 845 ft long, weighing 12 tons is shown here being vulcanized in rotary press at Boston Woven Hose & Rubber Co., Cambridge, Mass. Recently installed to increase copper-ore load-moving capacity at Chino Mines, Kennecott Copper Co., Kennecott, New Mexico, 54-in. belt is 8-ply 42 oz duck with 5/16 top and 3/32 bottom cover

150 strokes per minute there is very little time for the flywheel to accelerate or decelerate, and the standard motor which has approximately 3 per cent slip is entirely adequate for the application. Quite often someone tries to use class 2 motors on these high torque applications. If they do not overheat, trouble may develop in the form of mechanical failure of the rotor due to the unequal heating in the double-deck winding as previously explained.

Other applications involve frequent starting and stopping or reversing which may or may not include variable running loads and even periods when the motor is at rest. These applications are much more difficult to calculate, and it is usually hard to get a set of fixed operating conditions. Typical applications of this type include small hoists, skip hoists, reversing turrent lathes, drilling and tapping machines, and centrifugals of various kinds. Every attempt is made by the machinery builder to reduce the inertia of the revolving parts, since it is obvious that the heating of the motor is directly proportional to the inertia of the drive. While 15 to 10 reversals per minute are common, some applications require 40 to 50 reversals per minute.

Motors Given Low Rating

For quite a number of years small hoists were used almost exclusively for a very intermittent type of service perhaps a few times per hour or even a few times a day with the motor being energized for only a few minutes. It became common practice to give these motors an intermittent rating of either ¼ or ½ hour and to design them with high resistance rotors. Primary of the winding was saturated so as to obtain the maximum amount of torque from the smallest frame size of the motor. Efficiency power factor and heating were not considered.

Use of small hoists has rapidly expanded, and they are now often used in applications such as production assembly lines where they are used on a given duty cycle for 24 hours per day. Under such conditions the efficiency of the motor on a given duty cycle must be seriously considered and the motor designed to reduce the losses and to avoid overheating.

More iron and copper must be used for a given horsepower and torque rating to reduce running losses. This may result in an increase in frame size. The slip of the motor is decreased so as to balance more equally the running and accelerating losses. Recently a small hoist manufacturer tested two motors on an identical duty cycle. The only difference between the two motors was that one had a rotor resistance giving 5 per cent

slip at full load and the other giving 10 per cent slip at full load.

The motor carried approximately full load current for 20 sec during hoisting, approximately 1/3 load for 20 sec during lowering, and was making approximately one complete cycle each minute. On account of the comparatively long running time it was found that the running losses were considerably in excess of the starting and stopping losses with the 10 per cent slip motor and that these losses were much more nearly balanced with the 5 per cent slip motor. After 4 hours the 10 per cent slip motor had a temperature rise of 95° while the 5 per cent slip motor had a temperature rise of 58°.

Correct motor for this application is obvious although if this same hoist were used on an application of a very intermittent nature the 10 per cent slip motor would be used and would have the advantage of having slightly less starting current than the 5 per cent slip motor.

It is quite often desirable to build the motor into the machine or to enclose the motor to protect it from cast-iron dust, oil fumes or other dirt in the surrounding atmosphere. These enclosures restrict the ventilation and reduce the amount of heat that can be dissipated.

Descaling and Desanding

(*Concluded from Page* 104)

acid dip which is the next process.

Work next is placed in dilute sulphuric acid for no more than 1 min. This removes any iron particles reduced from iron oxide which might still be adhering to the surface of the metal. This operation may be omitted if desired, as it accomplishes very little cleaning.

Final step is a neutralizing and corrosion-retarding bath, operating at 200° F. This is made up of weak sodium cyanide, 0.2 oz of NaCN/gal, which serves to neutralize any acid remaining on the surfaces of the work. Simultaneously, it provides protection against corrosive action.

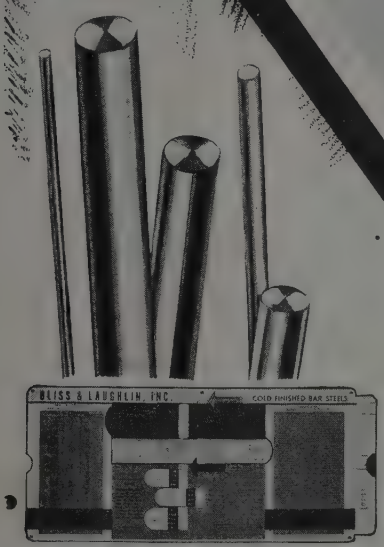
Capacity of the furnace shown in one of the accompanying illustrations is about 1250 lb per hour. Of course, capacity of the furnace also depends on the size and shape of the work that is to be treated.

According to Ajax, materials may remain in the reducing bath for hours without causing any injurious effects upon the base metal of the work. The same holds true for the fixtures or baskets used for immersing the work. Due to automatic temperature control in both the reducing bath and the neutralizing and corrosion-retarding bath, no skilled labor is required for the operation of the setup.

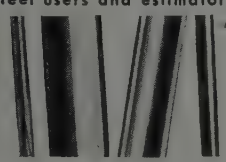
ADVANCE

PRODUCTION WITH B & L ANNEALED ALLOY STEELS

Typical high-strength machine parts, fabricated from B&L Cold Finished ANNEALED ALLOY BAR STEELS.



Ask for the new B&L DATALATOR . . . a handy calculating chart for production men, engineers, steel users and estimators.



There is a general trend toward the substitution of Alloy Steels for carbon grades in fabricating many standard types of heavy duty parts . . . based on the fact that their longer and more dependable service life, plus ease in heat treating, will outweigh material price differentials.

The use of B&L *annealed* Alloy Steels, developed by the latest methods in controlled cycle annealing, will assure you of receiving material which will give maximum machinability for the grade.

These B&L Alloy Bars are available in all standard grades . . . *annealed cold finished* to suit your fabricating operations on automatic, semi-automatic, hand-crew machines or single purpose machines.

BLISS & LAUGHLIN, INC.

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Sales Offices in all Principal Cities

COLD FINISHED STEEL AND SHAFTING

Slotting Marine Bearings

(*Concluded from Page* 103)

parallel to the cross rail around the geometric center of the bearing shell when clamped. Swivelling movement is imparted by two worm and segmental worm gears which are hand-wheel operated from both sides of the machine. Note Fig. 5.

Cutter head also swivels in its housing. Thus the milling cutter can be used in three positions—vertically, at right angles, on either the right or left side. This allows the cross slide on the gear box to be changed to the down feed or vice-versa. Movement of slides always registers parallel to the plane of the cut or at right angles to it. The three positions of the cutter head also reduce the required angle of swivelling about the center line of the bearing to plus or minus 45 degrees. A larger cutting head which is interchangeable with the small one is equipped with an adjustable spindle for slotting larger bearings. This enables the spindle to reach farther than the limitations of the slide adjustment.

A total of 16 changes in spindle speeds on the machine is made possible by a 2-speed motor together with change gear combinations and belt changes. Variations in cutter surface speed cover a range of 75 to 425 fpm. Belt changes are made quickly since the motor base hinges at one side of the motor-base casting, and is raised or lowered by a toggle lever and hand wheel on the opposite side of the machine.

During roughing operations the machine uses a 3 or 4-lipped carboloy cutter. This makes it possible to rough naval bronze at approximately 2½ lb of chips per minute. See Fig. 2. Higher cutting speeds are limited by vibration resulting from the overhang of the cutter head. The machine rough finishes each slot in the bearings with one cut, removing two V-corners and about 0.025-in. of metal from the bottom of the slot. The final finishing cut is made at high speed. This is made up one side of the slot and down the other, removing the balance of the metal on angle sides and about 0.015-in. from the bottom.

Surface speeds of the table can be varied from ½ to 60 ipm through three change gears controlled by the operator through levers extending from both sides of the machine. For indexing purposes, the machine is capable of proving a table speed of 50 fpm.

—o—

A new transparent plastic drafting board instrument using stencil principle is offered by RapiDesign Inc., Glendale, Calif., as an aid to designers and draftsmen in radio, television and electronics fields. Device enables quick fill-in of standard electric symbols.

ENGINEERING ABILITY

DSM

BACKED BY 30 YEARS OF EXPERIENCE

DETROIT SHEET METAL WORKS

DETROIT, MICH. U.S.A.

EXPERIENCE and ability acquired in thousands of installations are at your service when selecting D. S. M. equipment.

D. S. M. case histories have been derived from equipment furnished to plants throughout U. S. A. and to Dagenham, England; Clichy, France; Bombay, India; Batavia, D. E. I.; Sao Paula, S. A.; Turin, Italy; etc. D. S. M. equipment means rapid cross flow circulation for speedy and uniform drying or baking. This eliminates case hardened products.

If you wish to convert your present system to the new postwar economy, it will be to your advantage to try our Go-Out Plan. This means that you will enjoy the services of our highly experienced engineers, who will personally inspect your system and work together with the various departments in your plant in need of special help. Their recommendations for whatever new installations may be required will place you in a position to secure a layout that will more than justify your outlay.

DETROIT SHEET METAL WORKS, 1270 OAKMAN BLVD., DETROIT 6, MICHIGAN

PLANT ENGINEERING: *Consulting assistance in plant layout to coordinate departmental operations, our experience dated from 1917 in this field.*

Such plant layout may be based on increasing production beyond present capacity, or it may be a rearrangement in this post-war period when operations are conducted under a new set of conditions.

MOTOR CLEANING EQUIPMENT: *Washing machines for cleaning tear-downs. Kerosene spray or similar solvent usually used as the cleaning medium.*

FORMED COWLINGS, PANELS, ETC.: *To your specifications, and of light metal alloys as required. Weldments and brazed assemblies may be under controlled atmosphere.*

PILOT EQUIPMENT: *Sample size equipment for development of heavy equipment.*

VERTICAL CORE BAKING OVENS • CONTINUOUS HORIZONTAL BAKING OVENS • BATCH TYPE CABINET OVENS • DRAWER OVENS

DETROIT SHEET METAL WORKS

DETROIT -6- MICHIGAN

Railworthy Wheelmaking

(*Concluded from Page* 110)

floor inspection for forging and rolling defects. Then, unless the wheels are to be heat treated, they are machined in accordance with specifications. Any plate holes required are either hot punched after the rolling operation, or are drilled after finish machining with a flat drill, and burrs removed. Fig. 9 shows one of the two types of lathes used in the Butler plant for the work.

When all machining is completed, wheels are inspected carefully for tape size, contour, rim, tread and hub dimensions, and for eccentricity of bore. Serial and heat numbers then are recorded and checked against production records.

Some wheels are heat treated—quenched and drawn—to increase the hardness of the rims and generally improve physical properties. A harder rim decreases tendency of the tread to shell, a defect caused by severe service conditions and heavy loads. These, soon after the controlled cooling operation described, are piled two high horizontally, separated by 4 in. spacers, in a continuous circular heating furnace.

Furnace is gas fired, and the temperatures of each of its several zones are controlled automatically. The wheels are brought up to quenching temperature in about 6 hours, and are soaked at this temperature for another 2 hours.

Those to be fully oil quenched are immersed with an automatic quenching fixture in a 4000 gal oil tank. Note Fig. 10. The oil is cooled by recirculation through a heat exchanger. Length and time wheels are in the oil is controlled by an automatic timing device, and varies from 4½ to 6 min, depending on the design and carbon content of the wheel. Internal stresses are further reduced by the quenching.

Immediately after quenching, the wheels are placed in a recirculating hot-air draw furnace. Each furnace holds six wheels and has its own automatic thermocouple control. By using a patented system of differential heating, the hardness of the wheel, from hub to the rim, is varied. The hub is made soft enough to be machined easily, and the plate is made tougher to resist stresses—eventually built up in service. Length of time for the entire drawing operation depends again on the design of the wheel and the carbon content, but may take as long as 18 hours.

After drawing, wheels are again control cooled in brick-lined pits from 36 to 54 hours, or until their temperature is 300°F or less.

The brinell hardness of the rim and hub of the top and bottom wheel of each draw furnace lot is made as a final check in Fig. 11. Hardness of the rim will fall within limits of the specification, the minimum of the lowest carbon class being 225, and the maximum of the highest carbon class 363. Hardness of the hub will be 270 brinell maximum in all classes. Following the hardness measurements the wheels are sent to the finishing department for final dimension adjustments.

More Than 500 Welds

(*Concluded from Page* 105)

excellent strength, a minimum of distortion and a neat appearance.

In cases where there was great variation in thickness, it was possible fatigue failure would occur in the thinner section, next to the lap. Because of this, it was desirable to keep both pieces as nearly alike in thickness as possible. The longitudinal seams, in some instances, were designed for a flush joint without the necessity of grinding. These were made by clamping the joint in a fixture and backing it with hydrogen, and then welding it by the atomic-hydrogen process as in Fig. 2.

The hydrogen backing was provided by burning hydrogen in a groove milled in the backing bar of the fixture. On thicknesses up to 1/16-in., it proved to be possible to butt the edges up square and, using the fixture as mentioned, weld the seam without the addition of filler or the use of flux. This resulted in a nearly flush joint that did not require cleaning and had excellent physical strength. The use of filler was eliminated by clamping both sides of the joint tightly within ¼-in. of the joint. Bringing the heat of the arc to the metal expanded it and forced it to hump at the joints. This hump was melted down, giving a flush weld. As the metal cooled, a little elongation occurred betwen the clamps, but this was so slight that it had little effect upon the strength of the joint. In some cases where a fillet weld was necessary between sheet stock and a heavier section, the metal arc welding process was used to good advantage.

It is known that distortion caused by welding, especially in sheet metal parts, is practically unavoidable. In order to make use of the advantages of these parts, however, allowance had to be made for this distortion wherever possible. When this allowance could not be made, however, it was possible to reduce the distortion by using proper fixtures and sequence. In some cases, welding sequence was used to reduce distortion and machining sequence to correct it.

By careful planning of operations in manufacturing the engine, it was possible to solve these problems, and to make parts according to specifications.

the BUSINESS TREND

THE STEEL industry's current high rate of production gives promise of a continued rise in industrial activity in general, for in many instances manufacturing has been impeded by insufficient supplies of steel for processing and by lack of productive machinery made of steel.

While STEEL's industrial production index for the week ended July 6 dropped 11 points from the previous week that decline resulted from reduced electric power consumption and from decreases in output in the automobile industry during the Fourth of July holiday, but when figures are available for the week ended July 13 it will be found that industrial activity will have returned to approximately the postwar high mark of 143 per cent in the week ended June 29. The index for the week ended July 6 was 132 per cent.

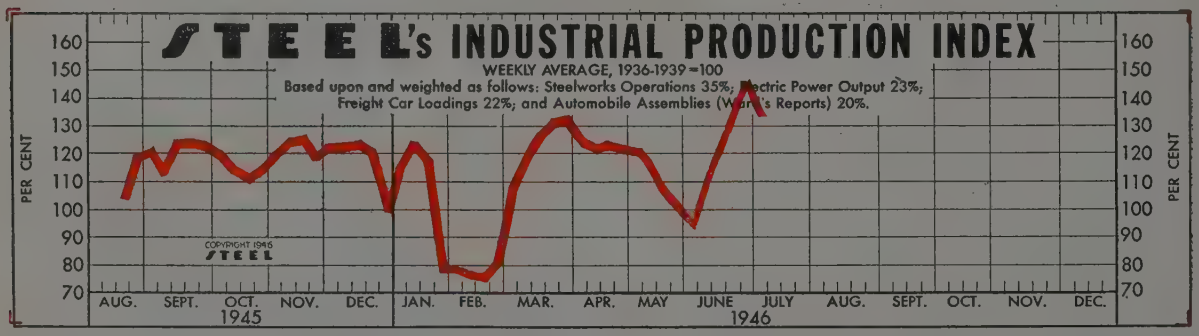
The current high level of industrial activity is based on orders which have been on the books for some time and does not reflect expiration of government controls on prices. Any stimulus or depressive effect growing out of continuation of a free market or the return of government controls will affect the index in later weeks.

CARLOADINGS—Railroad carloadings in June were considerably higher than those in any other month this year, and the Association of American Railroads predicts that loadings in the third quarter of 1946 will be 2.7 per cent above those in the third period of 1945. Predicted loadings for the third quarter of 1946 are 7,986,492 cars, compared with 7,773,308 cars in the corresponding period of last year. Among the increases are: Iron and steel, 4.7 per cent; other metals, 5.8 per cent; ore and concentrates, 5.7 per cent; coal and coke, 3.6 per cent; and automobiles and trucks, 112.1 per cent.

COAL—Contributing to a high level of carloadings in June was production of bituminous coal, which has been at a consistently high rate since the miners' strike ended. This high production is reducing the deficit of cumulative output this year compared with the corresponding period of last year. Production through June 29 was 234,540,000 tons, 21.1 per cent, or 62,885,000 tons, behind that for the corresponding period in 1945.

RAILROAD INCOME—Reflecting the coal and railroad strikes, an estimated deficit of $36 million was incurred in May by Class I railroads of the United States. In the corresponding month of 1945, they had a net income of $64,648,791.

CONSTRUCTION COSTS—Wage and price increases pushed the basic cost of industrial buildings in the second quarter of 1946 up 11 points on the index of the Austin Co., Cleveland. The increase represents the largest percentage advance in any one period since the third quarter of 1940.



The Index (see chart above): Latest Week (preliminary) 132 Previous Week 143 Month Ago 112

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)‡	88	88	55	88.5
Electric Power Distributed (million kilowatt hours)	3,741	4,133	3,920	3,978
Bituminous Coal Production (daily av.—1000 tons)	1,991	2,153	615	1,960
Petroleum Production (daily av.—1000 bbls.)	4,905	4,957	4,896	4,886
Construction Volume (ENR—Unit $1,000,000)	$123.5	$128.6	$182.2	$30.8
Automobile and Truck Output (Ward's—number units)	47,365	66,913	43,175	14,365

*Dates on request. ‡1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

TRADE

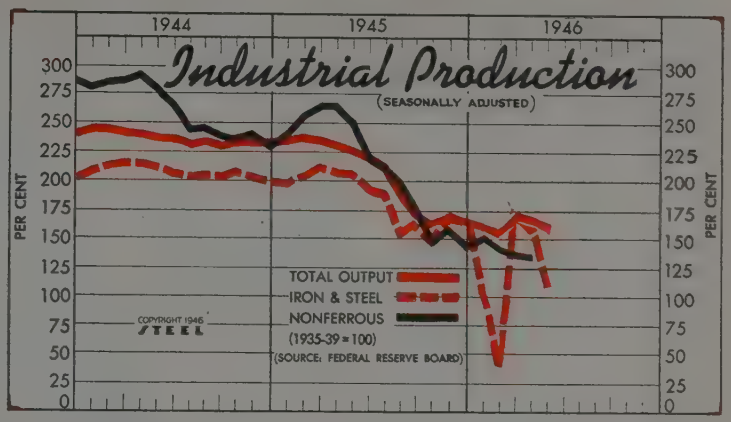
Freight Carloadings (unit—1000 cars)	860†	880	830	726
Business Failures (Dun & Bradstreet, number)	13	14	13	9
Money in Circulation (in millions of dollars)	$28,395	$28,135	$28,159	$26,834
Department Store Sales (change from like week a year ago)‡	+38%	+35%	+32%	+32%

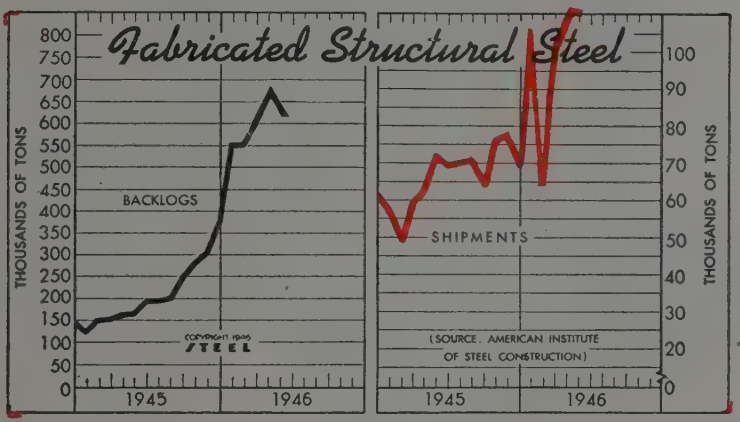
†Preliminary. ‡Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39 = 100)

	Total Production		Iron, Steel		Nonferrous	
	1946	1945	1946	1945	1946	1945
Jan.	159	234	105	197	150	240
Feb.	153	236	43	202	141	257
Mar.	168	235	169	210	133	265
Apr.	165	231	159	206	132	264
May	160	226	108	204	...	251
June	...	220	...	192	...	219
July	...	211	...	187	...	210
Aug.	...	187	...	155	...	198
Sept.	...	171	...	163	...	176
Oct.	...	163	...	146	...	147
Nov.	...	168	...	167	...	159
Dec.	...	164	...	165	...	144
Avge.	...	204	...	183	...	211





Fabricated Structural Steel

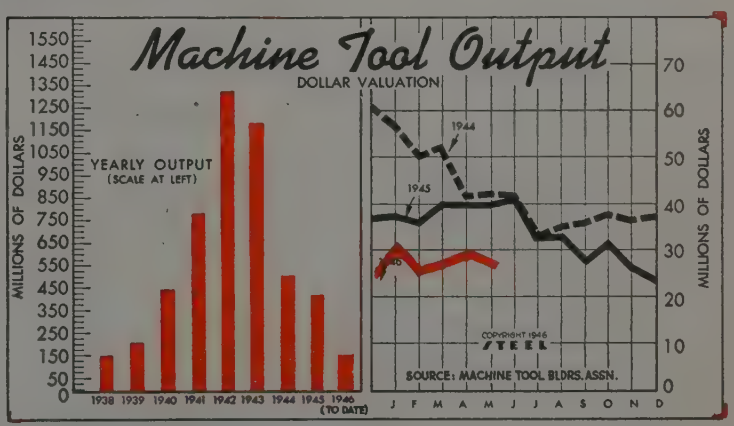
(000 Tons)

	Shipments			Backlogs		
	1946	1945	1944	1946	1945	1944
Jan.	107.5	57.0	35.2	552	124.4	113.1
Feb.	63.8	49.0	42.9	551	151.6	117.6
Mar.	102.8	59.5	41.4	605	153.3	106.3
Apr.	112.6	62.8	44.5	674	162.5	111.2
May	111.7	72.6	50.7	615	163.7	116.3
June	....	69.2	43.0	....	195.2	122.7
July	....	69.9	45.3	....	194.0	125.4
Aug.	....	70.6	55.2	....	201.1	130.4
Sept.	....	63.4	57.5	....	248.5	151.1
Oct.	....	76.6	61.6	....	282.8	174.4
Nov.	....	78.0	59.4	....	304.9	184.2
Dec.	....	68.8	61.3	....	375.2	142.5
Total	....	797.4	597.9	....	....	....

Machine Tool Shipments

(000 omitted)

	1946	1945	1944	1943
Jan.	$30,263	$37,353	$56,363	$117,384
Feb.	26,949	36,018	50,138	114,594
Mar.	27,326	40,045	51,907	125,445
Apr.	28,108	40,170	41,370	118,024
May	26,580	39,825	41,819	113,859
June	.....	41,040	41,471	108,736
July	.....	32,504	32,753	97,541
Aug.	.....	32,500	35,177	87,805
Sept.	.....	27,300	35,889	85,842
Oct.	.....	31,200	37,516	78,302
Nov.	.....	26,000	36,277	71,811
Dec.	.....	23,200	36,784	60,873
Total	.....	$407,155	$497,464	$1,180,216



FINANCE

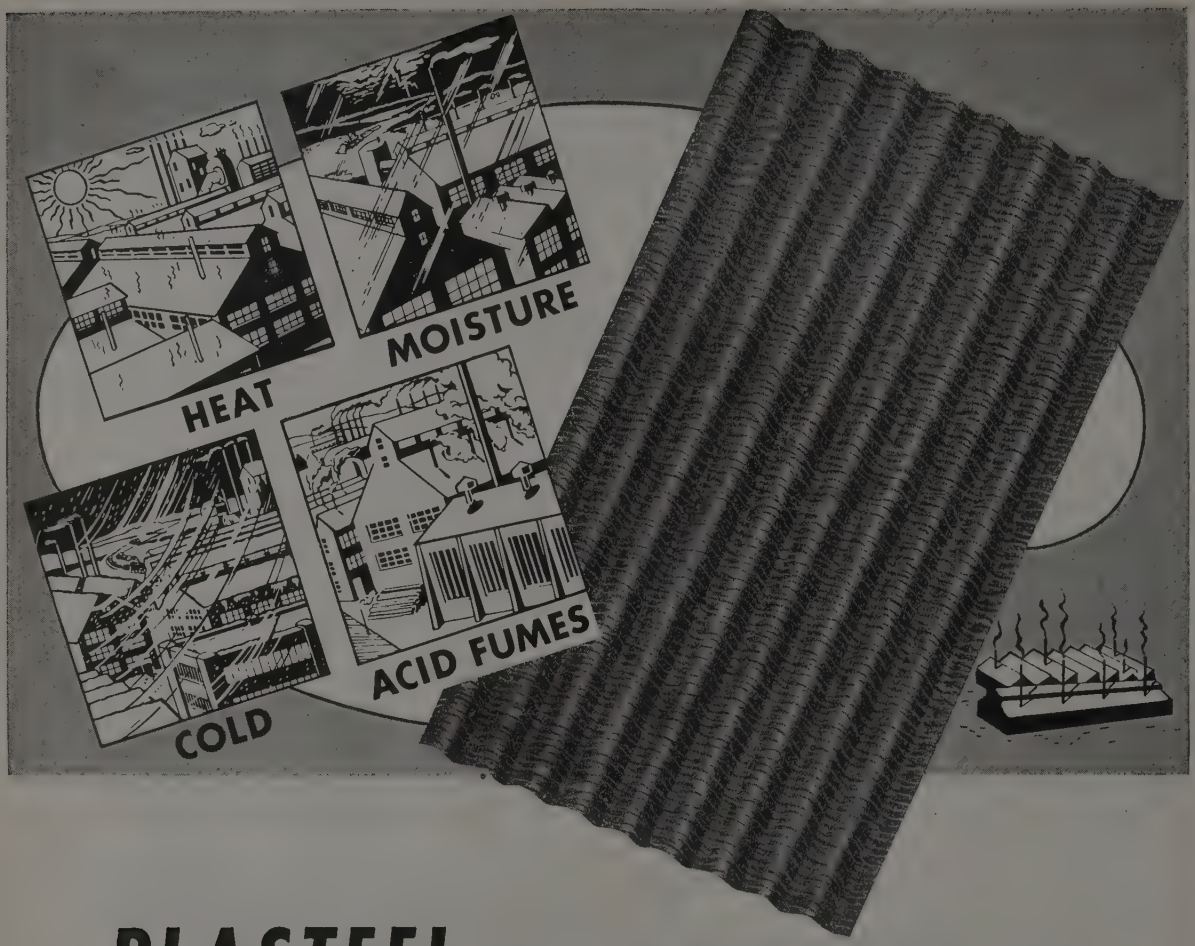
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,204	$12,435	$10,769	$10,604
Federal Gross Debt (billions)	$269.9	$269.2	$271.4	$259.1
Bond Volume, NYSE (millions)	$13.8	$8.2	$19.1	$20.3
Stocks Sales, NYSE (thousands)	3,459	5,108	5,582	4,115
Loans and Investments (billions)†	$61.7	$62.5	$63.9	$63.5
United States Gov't. Obligations Held (millions)†	$43,437	$44,324	$45,593	$46,543

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$64.45	$64.45	$63.54	$58.27
All Commodities†	112.7	112.4	111.1	105.9
Industrial Raw Materials†	126.7	126.0	125.1	118.7
Manufactured Products†	107.8	107.7	106.5	102.0

†Bureau of Labor Statistics Index, 1926 = 100.



PLASTEEL eliminates "Deterioration" from ROOFING • SIDING and building accessories

Modern construction methods introduced steel into buildings because it was the lightest and strongest (compared to bulk and weight) material that could be used. Ever since its first use builders have been striving to achieve PERMANENCY in steel construction—freedom from deterioration, rust and corrosion.

PLASTEEL—the physical and chemical combination (by heat and pressure) of Plastics—Steel and pure Mineral Mica has accomplished this in roofing, siding and building accessories.

The steel core gives this Modern Permanent Material the desired strength—the Plastic gives it the protection from deterioration caused by fumes, weather and atmospheric conditions, by hermetically sealing the pores and surfaces of the steel or metal. And the Mica gives it the final protective finish and appearance . . . the ideal combination that provides permanent protection.

Plasteel requires no maintenance—no painting—no patching—because there is no rust deterioration. Let us send you samples and complete data. Write, wire or phone!

PROTECTED STEEL PRODUCTS

Standard Life Bldg., Pittsburgh, Pa. • Plant: Washington, Pa.

Advertisement

JULY, 1946

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by Bridgeport Brass Co. "Bridgeport" BRASS *Headquarters for BRASS, BRONZE and COPPER*

Bridgeport's Warehouse Service

Can Help The Metal Goods Manufacturer

Now, that the long awaited postwar period is at hand, the manufacturer of metal goods has far different kinds of problems to contend with than he anticipated. If he is happy because he is deluged with orders, then he is worried because of high costs and inadequate ceiling prices. Finally when he thinks he is ready to go into production, he is plagued with material and supply shortages brought about by labor trouble, transportation delays, unusually long deliveries, etc., etc.

As a processor of non-ferrous metals and alloys, Bridgeport Brass is confronted with similar problems except that they are on a much larger scale. First of all, our obligations to our customers are more far reaching. We must anticipate their requirements for brass and copper products so that they can operate without interruption to supply the long felt wants of the public.

In spite of serious strikes throughout the country and, in fact, in our own industry itself, Bridgeport has been most fortunate in being able to carry on without interruption of production.

Customers are asking for much more metal than they required in the pre-war period. This is to be expected and we had planned accordingly. Even with full capacity operation, however, we have not been able to take care of the demand, especially during the time when many other brass suppliers had been shut down due to strikes in their own plants. Nevertheless, we have tried to allot our output fairly to all of our customers so that they will receive at least a portion of their requirements directly from our mills. In the meantime, many of them have been getting aid from our warehouses which are strategically located in large manufacturing centers such as Chicago, Cleveland, Denver, Houston, Los Angeles, Minneapolis, Newark, Providence, St. Louis and San Francisco.

Warehouse stocks are naturally limited, but if used wisely they can be of inestimable help to manufacturers while they are waiting for mill shipments to arrive. During this period, if necessary, they are able to pick up from the warehouses, limited quantities of strip, rod, wire and tubing, and they can proceed to make sample quantities of their products. Customers, whose requirements for certain items are not large, can often purchase them from the warehouse instead of waiting for the mill to make up the small lots which interrupt volume production.

In order to extend the usefulness of available stocks of strip metal, slitting and straightening equipment has been installed in most Bridgeport warehouses, and wider coils of metal can be sheared to required narrower widths.

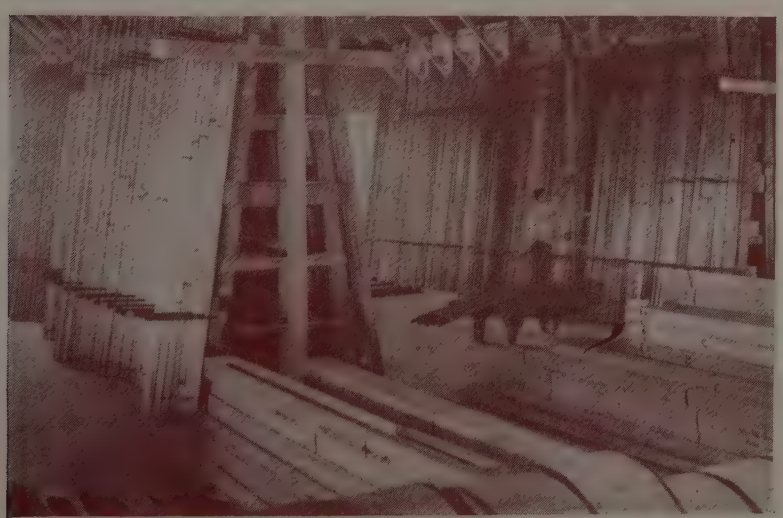


Fig. 1. View in one of the Bridgeport Brass warehouses showing stock of brass and Duronze rods.

Fig. 2. Slitting machine, shearing metal into narrow strips.

With an eye to greater service, Bridgeport warehouses carry special stocks designed to serve the needs of the territory in which they are located. In such centers as Chicago, Cleveland, St. Louis and Newark, for example, stocks of a general nature, such as strip metal in various gauges and alloys, free-turning rod, Duronze III screw machine rod, wire in coils, brass pipe and copper tubing, are carried in a variety of sizes. Condenser tubes, however, are not carried in all of our warehouses, but are sold from stock by St. Louis, Los Angeles, San Francisco and Houston, where they serve the oil refineries and marine industry. In the case of our Providence warehouse, we carry a wide range of strip metal in commercial bronze, nickel silver and, of course, yellow brass, as well as many high copper wire alloys to take care of the manufacturers of costume jewelry, metal buttons and dress ornaments. Our Akron warehouse, on the other hand, carries no mill products whatsoever, but stocks automobile tire valves and accessories, which are supplied to rubber companies and manufacturers of automobile tires.

Since warehouse stocks are maintained for the convenience of customers, warehouse managers appreciate any suggestions as to the items and sizes in strip, rod, wire and tubing which will best serve them in emergencies. In other words we believe that warehouse stocks should be flexible, changing with the needs of the industries they serve.

Bridgeport warehouses are operated in conjunction with district offices so that our customers can receive help from technically trained men who are completely familiar with brass making and can advise them in the selection of materials which will provide most efficient production at highest quality.

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.

EFFECT OF STRESS ON CORROSION

Vibrating or Cyclic Stresses Accelerate Cracking

In the June issue of this column, we discussed the nature and appearance of fatigue cracks. We will now consider briefly the most common factors which influence them.

The rapidity with which these fatigue cracking failures occur depends upon a large number of factors which may operate in an adverse (a) or beneficial (b) manner.

Because of limited space, these factors will be discussed in greater detail in subsequent issues of the Copper Alloy Bulletin.

(1) Amplitude of vibration (magnitude of stress) (a)

(2) Number of cycles of stress (a)

(3) Alloy (a) or (b)

(4) Extent of cold work (b) or (a)

(5) Microstructure (internal flaws, slag inclusions, blow holes, etc.) (a)

(6) Heat treatment (carburizing, nitriding and quenching) (b) or (a)

(7) Surface conditions (polished, machined, rough, decarburized, peened and shot blasted) (a) or (b)

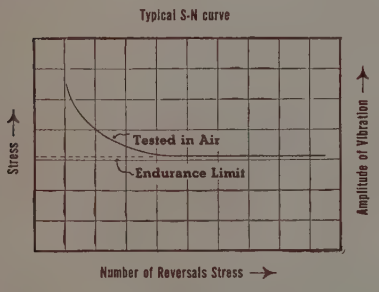
(8) Elevated temperature (a)

(9) Design or shape (notches, fillet shape and angles) (a)

(10) Corrosive environment (a)

Endurance Limit

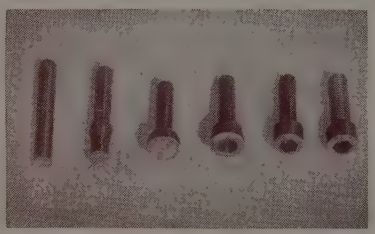
The effect of the stress and number of cycles of stress is illustrated in the following Stress/Number of cycles curve (which is typical of many metals) commonly called S-N curve.



This curve indicates that as the magnitude of the stress is reduced, the metal will withstand a larger number of stress cycles before fracture occurs. The endurance limit corresponds to the asymptote of the S-N curve.

Duronze V Ideal For Cold Heading Bolts and Nuts

Cold heading and thread rolling operations employed by the Allen Manufacturing Company, Hartford, Conn., demonstrate the economies made possible by Duronze V (silicon bronze) in making high-strength, corrosion-resistant screw products. The remarkable malleability of Duronze V, even when hard drawn, makes it comparatively easy on heading tools, and the fact that this material does not require heat treatment before or after heading means savings in manufacturing costs. Since no metal is removed in either cold heading or thread rolling, further economies are effected, in saving of metal.



The photograph shows an Allen head bolt, made by cold heading Duronze V wire.

The Allen head bolt, shown in several stages of manufacture, illustrates the steps of the cold heading process. Duronze V wire is fed into a header, where it is automatically cut off to length, upset, formed, countersunk and finish formed. The next step is thread rolling, which cold forges the surface material of the blank into the thread form. The resulting thread is from 15 to 20 per cent stronger than a cut thread.

Duronze V is recommended for all types of cold headed screw products. Parts fashioned of this superior alloy display unusual tensile strength, averaging over 100,000 psi, and are practically immune to stress corrosion cracking. Bridgeport Brass supplies Duronze heading wire of the correct temper, surface, uniform composition and size necessary to meet the requirements of modern mass production methods.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Motor Driven Timing Unit with single-pole double-throw switch closes and opens a single circuit at the end of a chosen time interval, or closes one circuit and opens a second at the end of the interval. Any one of ten maximum intervals are available between 15 sec. and 24 hrs. Corresponding dial divisions are 1/4 sec. to 30 minutes. **No. 696**

Portable Dial Indicator Gauge to inspect internal threads from 7/16 to 1 1/2 inches is especially useful where work is too heavy to carry to a bench or while parts are still in a machine. Gauge indicates any out of roundness, presence of burrs, inaccuracies in threads. Indicator reads plus and minus in .0001 inch divisions to .0025 inch. **No. 697**

New Instrument Reads Deflection to .1 in. recurring at rates to 100 cps. Small plunger extending from one face of new Deflection Pick-Up is contacted by suitable means against diaphragm or moving surface at which deflection is to be measured. **No. 698**

Hand and Machine Taps capable of cutting many more threads per grind have recently been announced. New tap has hard ductile 83 Rockwell C case measuring .00003 in. thickness which minimizes chip and surface friction. Hand sizes available from 1/4 to 1 1/2 inches; machine-screw taps from No. 0 to No. 14. **No. 699**

New Hydraulic Heat Treating Machine for specified work in connection with a suitable source for induction energy. It is used for shafts 3/4 to 2 in. in diameter and 3 to 24 in. in length. Treatment can be applied throughout shaft length at speed to 2 in. per sec. or at predetermined single or multiple locations along shaft. **No. 700**

Multi-purpose Machine for boring, drilling, threading and milling large work can be rapidly traversed or fed vertically between 33 and 105 in. above floor. Can also be positioned horizontally or at any angle between 45 deg. above and below horizontal. **No. 701**

Bellows Operated Gauge to read vacuum or low pressures in various gases and liquids. Supplied in pressure ranges from 10 in. of water to 10-lb. pressure. Vacuum ranges from 10 in. of water to 20 in. of mercury. **No. 702**

MARKET SUMMARY

Preference Tonnage Begins To Disrupt Mill Schedules

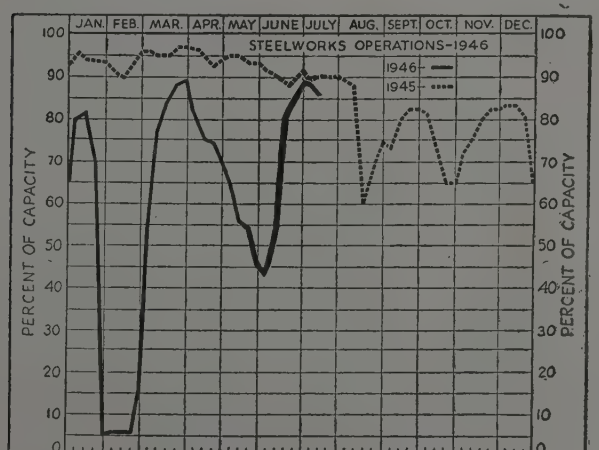
Displaces tonnage long on books and adds to carryover . . . Many duplicate orders believed in backlogs . . . Prices being held

STEEL tonnage being certified to mills for housing and agricultural implement manufacture is beginning to interfere with schedules already set up for third quarter. This is increasing and its greatest effect has been felt in orders for September delivery. This will dislocate considerable tonnage already set for rolling in that month and will increase carryover into fourth quarter and also into next year.

There is a growing feeling that considerable duplicate buying was done in fourth and first quarters, especially in flat-rolled steel, and that much tonnage of this sort is in present backlogs and will not be brought out until steel supply becomes more ample. Most of this tonnage probably would be taken in unless production and deliveries catch up sooner than is now apparent.

Prices are being held at former OPA ceilings, pending decision as to the future of that agency, no disposition being shown to advance quotations, even on products which show no profit. However, with pig iron and scrap prices pressing for a higher range when the OPA situation is disposed of, a higher range for steel products seems inevitable. This is expected to appear first in marginal products, where profits are practically impossible under present prices. A better balance in prices would improve supply of the latter products if a profitable level were reached.

Pig iron supply shows little sign of improving, though the number of active stacks is being enlarged from time to time. In face of a tremendous demand from foundries and a heavy drain from open hearths to make up for scrap shortage there is not enough to go around. Producers are alloting tonnage to regular customers in an effort to serve all equally but foundries in general are far short of requirements and have curtailed operations or closed for vacations in the effort to build some inventory.



DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended July 13	Change	Same Week 1945	Same Week 1944
Pittsburgh	86.5	—10.5	87	90.5
Chicago	88	None	94.5	98.5
Eastern Pa.	85	None	87	95
Youngstown	87	+ 3	90	96
Wheeling	89	— 1.5	91.5	102
Cleveland	89	None	78	91
Buffalo	88.5	None	90.5	90.5
Birmingham	99	None	95	95
New England	55	+10	85	89
Cincinnati	77	— 4	91	86
St. Louis	54.5	None	78	79.5
Detroit	89	+ 4	80	85
Estimated national rate	86	— 2	90	96.5

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Price advance by two makers in the South has not been followed by similar action in other areas. Some melters are accepting off-grade iron from furnaces and little insistence is placed on exact analyses.

Scrap dealers in general are holding the line on prices and no intimation is heard of general increases while OPA fate is uncertain. Although the industry was seeking higher ceilings by $2 to $2.50 per ton before OPA was allowed to expire there is no pressure at present for such an increase and material is being shipped at the former ceilings. Consumers would resist higher prices as a factor tending to increase steel prices, which is deemed unwise until the situation has been clarified as to continuance of price controls. Supply is short and some holders are believed to be awaiting higher prices before releasing stocks. However, this is not believed to apply to any large tonnage and most producers are selling their accumulations at the market. Should OPA be finally killed the situation would be entirely different and higher prices would be likely to develop.

A two-day strike by railroad workers at Carnegie-Illinois Steel Corp. plants in the Pittsburgh district was mainly responsible for reducing the estimated national steel rate 2 points last week, dropping to 86 per cent of capacity. In addition to the drop of 10½ points to 86½ per cent at Pittsburgh, Wheeling lost 1½ points to 89 per cent and Cincinnati 4 points to 77. Youngstown advanced 3 points to 87, Detroit 4 points to 89 and New England 10 points to 55. Other districts were unchanged, as follows: Chicago 88, St. Louis 54½, Birmingham 99, Buffalo 88½, Cleveland 89, eastern Pennsylvania 85 and West Coast 84.

Steel ingot production in first half this year showed a loss of 15,778,368 net tons from the corresponding period last year, output being 27,364,714 net tons, at an average rate of 60 per cent, compared with 43,143,082 tons at 91 per cent in first half, 1945. June production was 5,660,386 tons, compared with 4,072,452 tons in May, and with 6,840,522 tons in June, 1945.

Because of higher price on southern pig iron the average composite price of steelmaking pig iron has risen 25 cents, to $25.75 per ton. Other composites are unchanged, finished steel at $64.45, semifinished steel at $40.60 and steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	July 13	July 6	June 29	One Month Ago June, 1946	Three Months Ago April, 1946	One Year Ago July, 1945	Five Years Ago July, 1941
Finished Steel	$64.45	$64.45	$64.45	$64.09	$63.54	$58.27	$56.73
Semifinished Steel	40.60	40.60	40.60	40.60	40.60	37.80	36.00
Steelmaking Pig Iron	25.75	25.50	25.50	25.50	25.50	24.00	23.00
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others dollars per gross ton.

Finished Material

	July 13 1946	June, 1946	Apr., 1946	July, 1945
Steel bars, Pittsburgh	2.50c	2.50c	2.50c	2.25c
Steel bars, Philadelphia	2.86	2.82	2.82	2.57
Steel bars, Chicago	2.50	2.50	2.50	2.25
Shapes, Pittsburgh	2.35	2.35	2.35	2.10
Shapes, Philadelphia	2.48	2.465	2.465	2.215
Shapes, Chicago	2.35	2.35	2.35	2.10
Plates, Pittsburgh	2.50	2.50	2.50	2.25
Plates, Philadelphia	2.558	2.55	2.55	2.30
Plates, Chicago	2.50	2.50	2.50	2.25
Sheets, hot rolled, Pittsburgh	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Pittsburgh	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Pittsburgh	4.05	4.05	4.05	3.70
Sheets, hot-rolled, Gary	2.425	2.425	2.425	2.20
Sheets, cold-rolled, Gary	3.275	3.275	3.275	3.05
Sheets, No. 24 galv., Gary	4.05	4.05	4.05	3.70
Hot-rolled strip, over 6 to 12-in., Pitts.	2.35	2.35	2.35	2.10
Cold-rolled strip, Pittsburgh	3.05	3.05	3.05	2.80
Bright basic, bess. wire, Pittsburgh	3.05	3.05	3.05	2.75
Wire nails, Pittsburgh	3.75	3.55	3.25	2.90
Tin plate, per base box, Pittsburgh	$5.25	$5.25	$5.25	$5.00

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$38.00	$38.00	$38.00	$36.00
Slabs, Pittsburgh, Chicago	39.00	39.00	39.00	36.00
Rerolling billets, Pittsburgh	39.00	39.00	39.00	36.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.30c	2.30c	2.30c	2.15c

Pig Iron

	July 13 1946	June, 1946	Apr., 1946	July, 1945
Bessemer del. Pittsburgh	$27.69	$27.69	$27.69	$26.19
Basic, Valley	26.00	26.00	26.00	24.50
Basic, eastern del. Philadelphia	27.93	27.84	27.84	26.34
No. 2 fdry., del. Pgh. N. & S. sides	27.19	27.19	27.19	25.69
No 2 foundry, Chicago	26.50	26.50	26.50	25.00
Southern No. 2, Birmingham	24.88	22.88	22.88	21.38
Southern No. 2 del. Cincinnati	28.94	26.94	26.94	25.44
No. 2 fdry., del. Philadelphia	28.43	28.34	28.34	26.84
Malleable, Valley	26.50	26.50	26.50	25.00
Malleable, Chicago	26.50	26.50	26.50	25.00
Charcoal, low phos., fob Lyles, Tenn.	33.00	33.00	33.00	33.00
Gray forge, del. Pittsburgh	26.69	26.69	26.69	25.19
Ferromanganese, del. Pittsburgh	140.00	140.00	140.00	140.33

Scrap

Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke

Connellsville, furnace ovens	$8.75	$7.50	$7.50	$7.50
Connellsville, foundry ovens	9.50	8.25	8.25	8.25
Chicago, by-product fdry., del.	15.10	13.75	13.75	13.35

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis asof Feb. 15, 1946.

Semifinished Steel

Carbon Steel Ingots: Fob mill base, rerolling quality, standard analysis, $33.

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $48.69.

Rerolling, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41; Duluth (billets), $41; Pac. ports (billets), $51. (Andrews Steel Co., carbon slabs, $41; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Granite City Steel Co., $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49; Duluth, billets, $49; forging billets fob Pac. ports, $59.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 fob Toronto, O.; Geneva Steel Co., $64.64, Pacific ports.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.43; del. Detroit $60.43; eastern Mich. $61.43.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, fob mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lb, $2.30. Do., over ⅜—$\frac{47}{64}$-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.84c; Phila., del., 2.86c; Gulf ports, dock, 2.85c; Pac. ports, dock, 3.15c. (Sheffield Steel Corp. may quote 2.75c, fob St. Louis; Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.021c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(•Basic O-H)	AISI Series	(•Basic O-H)
1300	$0.108	4300	$1.839
2300	1.839	4600	1.298
2500	2.759	4800	2.326
3000	0.541	5100	0.379
3100	0.920	5130 or 5152	0.494
3200	1.461	6120 or 6152	1.028
		6145 or 6150	1.298
3400	3.462	8612	0.703
4000	0.487	8720	0.757
4100 (.15-.25 Mo)	0.757	9830	1.407
(.20-.30 Mo)	0.812		

• Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.725c, eastern Mich., 3.755c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c.

Iron Bars: Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.525c; eastern Mich. del., 2.575c; Phila., del., 2.615c; New York, del., 2.685c; Pacific ports, 2.975c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.60c. on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., del., 3.425c; New York, del., 3.615c; Phila., del., 3.635c; Pacific ports, 3.925c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.31c; Phila., del., 4.24c; Pacific ports, 4.60c.

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

Aluminized Sheets, 20 gage: Pittsburgh, hot-dipped, coils or cut to lengths, 9.00c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.90c	4.65c	4.00c
Armature	4.25c	5.00c	4.35c
Electrical	4.75c	5.50c	4.85c
Motor	5.425c	6.175c	5.525c
Dynamo	6.125c	6.875c	6.225c
Transformer			
72	6.625c	7.375c	.....
65	7.625c	8.375c	.....
58	8.125c	8.875c	.....
52	8.925c	9.675c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.55c; eastern Mich., del., 2.60c; Pacific ports, 3.10c. (Superior Steel Corp. may quote 3.30c, Pitts.)

Over 6-in.: Base, 2.35c; Detroit, del., 2.45c; eastern Mich., del., 2.50c; Pacific ports, 3.00c. (Superior Steel Corp. may quote 3.20c, Pitts.)

Cold-Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., del., 3.20c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

Cold-Finished Spring Steel: Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box, 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point; $4.65.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 15-lb $14.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.)

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.71c; Phila., del., 2.558c; St. Louis, 2.74c; Boston, del., 2.86c; Pacific ports, 3.05c; Gulf ports, 2.85c.

(Granite City Steel Co. may quote carbon plates 2.65c fob D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c fob Pac. ports; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c base.)

Floor Plates: Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.273c; Pacific ports, 4.49c.

Clad Steel Plates: Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.00c; Gulf ports, 2.70c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.60c, Bethlehem, Pa., on the general range and 2.70c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.20c.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

Wire to Manufacturers in carloads

Bright basic or bessemer ..... •$3.05
Spring (except Birmingham) ..... •$4.00

Wire Products to Trade

Nails and staples

Standard and cement-coated ..... †$3.75
Galvanized ..... ††$3.40

Wire, Merchant Quality

Annealed ..... §$3.50
Galvanized ..... §$3.85

(Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column)

Adjustments Pend

Delivered prices quoted on these pages are subject to upward revision in line with the Interstate Commerce Commission's order authorizing an increase in railroad freight rates, effective as of July 1. The order authorized a general 6 per cent increase with certain exceptions.

Woven fence, 15½ gage and heavier	72
Barbed wire, 80-rod spool	79
Barbless wire, twisted	79
Fence posts	74
Bale ties, single loop	72½

•Add $0.10 for Worcester, $0.05 for Duluth and $0.50 for Pacific ports.

†Add $0.30 for Worcester. $0.50 for Pacific ports. Nichols Wire & Steel may quote $4.25.

††Add $0.50 for Pacific ports.

§Add $0.10 for Worcester, $0.70 for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	53	30	½	21	0½
¼ & ⅜	56	37½	¾	27	7
½	60½	48	1-1¼	31	13
¾	63½	52	1½	35	15½
1-3	65½	54½	2	34½	15

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Elec. Weld— Hot Rolled	Cold Rolled
1″	13	.....	$9.90	$9.36	$9.65
1¼″	13	.....	11.73	9.63	11.43
1½″	13	$10.91	12.96	10.63	12.64
1¾″	13	12.41	14.75	12.10	14.37
2″	13	13.90	16.52	13.53	16.19
2¼″	13	15.50	18.42	15.06	18.03
2½″	12	17.07	20.28	16.57	19.83
2½″	12	18.70	22.21	18.11	21.68
2¾″	12	19.82	23.54	19.17	22.95
3″	12	20.79	24.71	20.05	24.02
3½″	11	26.24	31.18	25.30	30.29
4″	10	32.56	38.68	31.32	37.52
4½″	9	43.16	51.29	.....	.....
5″	9	49.96	59.36	.....	.....
6″	7	76.71	91.14	.....	.....

Pipe, Cast Iron: Class B, 6-in. and over, $54 per net ton, Birmingham; $62, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.

Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $51 net ton, base, Standard spikes, 3.65c.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; Reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

W.	Cr.	V.	Mo.	Base, per lb.
18.00	4	1	...	72.49c
1.5	4	1	8.5	58.43c
.....	4	2	8	58.43c
6.40	4.15	1.90	5	62.22c
5.50	4.50	4	4.50	75.74c

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Ceiling prices advanced 12 per cent, effective July 1, 1946; discounts remain unchanged.)

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-in. and smaller	...	64
½-in. and smaller	62	...
½-in.-1-in.	...	60
⅞-in.-1-in.	59	...
1⅛-in.-1½-in.	57	59
1¾-in. and larger	56	...

Additional discount of 10 for full kegs.

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset 1-in. and smaller	71 off
Headless, ¼-in. and larger	60 off
No. 10 and smaller	70 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

Stainless Steels

Base, Cents per lb

	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEELS					
302	25.96c	29.21c	36.79c	23.93c	30.30c
303	28.13	31.38	38.95	29.21	35.71
304	27.05	31.38	38.95	25.45	32.46
308	31.38	36.79	44.36	30.84	37.87
309	38.95	43.28	50.85	40.03	50.85
310	53.02	56.26	57.35	52.74	60.59
312	38.95	43.28	53.02	.....	.....
•316	43.28	47.61	51.94	43.28	51.94
§321	31.38	36.79	44.36	31.65	41.12
†347	35.71	41.12	48.69	35.71	45.44
431	20.56	23.80	31.38	18.94	24.35
STRAIGHT CHROMIUM STEEL					
403	23.93	26.51	31.92	22.99	29.21
••410	20.02	23.93	28.67	18.39	23.80
416	20.56	23.80	29.21	19.75	25.45
††420	25.96	30.84	36.25	25.70	39.49
430	20.56	23.80	31.38	18.94	24.35
‡‡430F	21.10	24.35	31.92	20.29	26.51
440A	25.96	30.84	36.25	25.70	39.49
442	24.35	27.59	35.17	25.96	34.62
443	24.35	27.59	35.17	25.96	34.62
446	29.76	33.00	39.49	37.87	56.26
501	8.66	12.98	17.04	12.98	18.39
502	9.74	14.07	18.12	14.07	19.49
STAINLESS CLAD STEEL (20%)					
(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)					
304	.....	19.48	20.56	.....	.....
410	.....	17.31	18.39	.....	.....
430	.....	17.85	18.94	.....	.....
446	.....	19.48	20.56	.....	.....

• With 2-3% molybdenum. § With titanium. † With columbium. •• Plus machining agent. †† High carbon. ‡‡ Free machining.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	•$8.75
Connellsville, foundry	9.25- 9.75
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J. ovens	14.40
Chicago, outside delivered	14.35
Chicago, delivered	15.10
Terre Haute, delivered	14.85
Milwaukee, ovens	15.10
New England, delivered	16.00
St. Louis, delivered	†15.18
Birmingham, delivered	12.25
Indianapolis, delivered	14.85
Cincinnati, delivered	14.60
Cleveland, delivered	14.55
Buffalo, delivered	14.75
Detroit, delivered	15.10
Philadelphia, delivered	14.63

•Operators of hand-drawn ovens using trucked coal charge $9.35.

†15.68 from other than Ala., Mo., Tenn.

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946.

	Hot-rolled bars	Structural shapes	Plates	Floor plates	Hot-rolled sheets (10-gage base)	Hot-rolled strip (14-gage and lighter, 6-in and narrower)	Hot-rolled strip (12-gage and heavier wider than 6-inch)	Galvanized flat sheets (24-gage base)	Cold-rolled sheets (17-gage base)	Cold finished bars	Cold-rolled strip
Boston	4.356[1]	4.203[1]	4.203[1]	6.039[1]	4.050[1]	5.548[1]	4.418[1]	5.725[14]	5.031[14]	4.656[21]	4.965
New York	4.103[1]	4.038[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[12]	4.838[14]	4.553[21]	5.075
Jersey City	4.155[1]	4.018[1]	4.049[1]	5.875[1]	3.856[1]	4.375[1]	4.275[1]	5.501[12]	4.890[14]	4.605[21]	5.075
Philadelphia	4.114[1]	3.937[1]	3.875[1]	5.564[1]	3.774[1]	4.664[1]	4.554[1]	5.499[1]	5.139[26]	4.564[21]	5.064
Baltimore	4.003[1]	4.05[1]	3.865[1]	5.543[1]	3.64[1]	4.293[1]	4.193[1]	5.365[17]	5.118[20]	4.543[21]	.....
Washington	4.232[1]	4.22[1]	4.067[1]	5.632[1]	3.842[1]	4.432[1]	4.332[1]	5.667[17]	5.007[24]	4.532[21]	.....
Norfolk, Va.	4.377[1]	4.303[1]	4.262[1]	5.777[1]	4.037[1]	4.927[1]	4.477[1]	5.862[17]	4.552[24]	4.677[21]	.....
Bethlehem, Pa.*		3.70[1]									
Claymont, Del.*			3.70[1]								
Coatesville, Pa.*			3.70[1]								
Buffalo (city)	3.60[1]	3.85[1]	3.88[1]	5.51[1]	3.575[1]	4.169[1]	4.069[1]	5.20[18]	4.625[18]	4.20[21]	4.919
Buffalo (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[21]	4.525[18]	4.10[21]	4.60
Pittsburgh (city)	3.60[1]	3.65[1]	3.65[1]	5.25[1]	3.575[1]	3.95[1]	3.850[1]	5.327[13]	4.625[24]	4.20[21]	4.70
Pittsburgh (country)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.475[1]	3.85[1]	3.750[1]	5.10[19]	4.525[24]	4.10[21]	4.60
Cleveland (city)	3.60[1]	3.88[1]	3.65[1]	5.48[1]	3.575[1]	3.95[1]	3.850[1]	5.347[13]	4.625[24]	4.20[21]	4.70
Cleveland (country)	3.50[1]	.....	3.55[1]	.	3.475[1]	3.85[1]	3.750[1]	.....	4.525[24]	4.10[21]	4.60
Detroit	3.70[1]	3.952[1]	3.90[1]	5.572[1]	3.675[1]	4.050[1]	3.950[1]	5.491[12]	4.725[24]	4.25[12]	4.95
Omaha (city, del.)	4.293[1]	4.343[1]	4.343[1]	5.943[1]	4.018[1]	4.493[1]	4.393[1]	5.965[18]	5.668[24]	4.898[21]	.....
Omaha (country)	4.193[1]	4.243[1]	4.243[1]	5.843[1]	3.918[1]	4.393[1]	4.293[1]	5.865[18]	.....	.....	.....
Cincinnati	3.861[1]	3.941[1]	3.911[1]	5.541[1]	3.650[1]	4.025[1]	3.925[1]	5.275[18]	4.700[24]	4.461[21]	4.961
Youngstown*	.....	.....	.....	.....	.....	.....	.....	4.85[23]	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.475[1]	3.85[1]	3.750[1]	5.10[18]	.....	.....	.....
Chicago (city)	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.475[1]	3.95[1]	3.850[1]	†5.40[18]	4.425[24]	4.20[21]	4.90
Milwaukee	3.887[1]	3.937[1]	3.937[1]	5.537[1]	3.612[1]	4.087[1]	3.987[1]	5.722[18]	4.562[24]	4.337[21]	5.037
Indianapolis	3.83[1]	3.88[1]	3.88[1]	5.48[1]	3.748[1]	4.118[1]	4.018[1]	5.368[18]	4.793[24]	4.43[21]	5.030
St. Paul	4.072[3]	4.122[3]	4.122[3]	5.722[3]	3.797[1]	4.272[1]	4.172[1]	5.635[18]	4.747[24]	4.811[21]	5.352
St. Louis	3.897[1]	3.947[1]	3.947[1]	5.547[1]	3.622[1]	4.097[12]	3.997[1]	5.522[18]	4.572[24]	4.481[21]	5.181
Memphis, Tenn.	4.265[1]	4.315[1]	4.315[1]	6.03[1]	4.190[1]	4.565[1]	4.465[9]	5.715[18]	5.005[24]	4.78[21]	.....
Birmingham	3.75[1]	3.80[1]	3.80[1]	6.153[1]	3.675[1]	4.05[1]	4.05[1]	5.20[18]	5.077[24]	4.99[21]	5.465
New Orleans (city)	4.358[1]	4.408[1]	4.408[1]	6.329[1]	4.283[1]	4.658[1]	.....	5.808[18]	5.304[24]	5.079[21]	.....
Houston, Tex.	4.00[3]	4.50[1]	4.50[1]	5.75[9]	3.988[3]	4.663[9]	4.563[9]	5.763[26]	5.819[18]	4.10[23]	.....
Los Angeles	4.65[4]	4.90[4]	5.20[4]	7.45[4]	5.225[4]	5.30[4]	5.200[4]	6.55[18]	7.425[6]	6.033[21]	5.868
San Francisco	4.20[7]	4.15[7]	4.15[7]	5.85[7]	4.125[7]	5.85[7]	4.50[7]	6.35[18]	6.875[18]	5.783[21]	7.583
Portland, Oreg.	4.70[27]	4.70[27]	5.00[27]	6.75[27]	4.875[27]	6.65[27]	5.000[27]	6.20[18]	6.825[18]	5.983[18]	.....
Tacoma, Wash.	4.60[6]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[18]	6.55[18]	6.23[21]	.....
Seattle	4.60[4]	4.70[6]	5.00[6]	6.75[6]	4.87[6]	5.80[6]	4.60[6]	6.40[18]	6.55[18]	6.23[21]	.....

* Basing point cities with quotations representing mill prices, plus warehouse spread; † open market price.

BASE QUANTITIES

[1]—400 to 1999 pounds; [3]—400 to 14,999 pounds; [6]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [9]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles.. [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [26]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.45
Mesabi nonbessemer	5.05
High phosphorus	5.05
Mesabi bessemer	5.20
Old range nonbessemer	5.30

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, cif Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mn.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	Nom.
Spanish, N. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	$28.30
48% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)

48% 3:1 less $7 freight allowance.	$43.50

Manganese Ore

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to established premiums, penalties and other provisions. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 10c per unit less than Metal Reserve prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Basic open-hearth Electric furnace

Designation	Chemical Composition Limits, Per Cent C	Mn	Si	Cr	Ni	Mo	Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.812	$16.230	$1.353	$27.050
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.812	16.230	1.353	27.050
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.866	17.312	1.407	28.132
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.703	14.066	1.244	24.886
NE 9912	10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.298	25.968	1.677	33.542

Extras are in addition to a base price of 2.921c, per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices per gross ton. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$27.50	$27.00	$28.50	$28.00
Newark, N. J., del.	29.20	28.70	30.20	29.70
Brooklyn, N. Y., del.	30.28	.....	.....	30.78
Birdsboro, Pa., base	27.50	27.00	28.50	28.00
Birmingham, base	22.88-26.88	21.50-25.50	27.50	.....
Baltimore, del.	28.22-32.22	.....	.....	.....
Boston, del.	27.68-31.68	.....	.....	.....
Chicago, del.	26.72-30.72	.....	.....	.....
Cincinnati, del.	26.94-30.94	26.06-30.06	.....	.....
Cleveland, del.	26.62-30.62	25.74-29.74	.....	.....
Newark, N. J.	28.82-32.82	.....	.....	.....
Philadelphia, del.	28.05-32.05	27.55-32.55	.....	.....
St. Louis, del.	26.62-30.62	27.54-31.54	.....	.....
Buffalo, base	26.50	26.50	27.50	27.00
Boston, del.	28.00	27.00	29.00	28.50
Rochester, del.	28.03	.....	29.03	28.53
Syracuse, del.	28.58	.....	29.58	29.08
Chicago, base	26.50	26.00	27.00	26.50
Milwaukee, del.	27.60	27.10	28.10	27.60
Muskegon, Mich., del.	27.69	.....	.....	27.69
Cleveland, base	26.50	26.00	27.00	26.50
Akron, Canton, del.	28.04	27.54	28.54	28.04
Detroit, base	26.50	26.00	27.00	26.50
Saginaw, Mich., del.	28.81	28.31	29.31	28.81
Duluth, base	27.00	26.50	27.50	27.00
St. Paul, del.	29.13	28.63	29.63	29.13
Erie, Pa., base	26.50	26.00	27.50	27.00
Everett, Mass., base	27.50	27.00	28.50	28.00
Boston, del.	28.06	27.56	29.06	28.56
Granite City, Ill., base	26.50	26.00	27.00	26.50
St. Louis, del.	27.00	26.50	.....	27.00
Hamilton, O., base	26.50	26.00	.....	26.50
Cincinnati, del.	27.61	27.11	.....	27.61
Neville Island, Pa., base	26.50	26.00	27.00	26.50
•Pittsburgh, del. N. & S. sides	27.19	26.69	27.69	27.19
Provo, Utah, base	24.50	24.00	.....	.....
Sharpsville, Pa., base	26.50	26.00	27.00	26.50
Sparrows Point, base	27.50	27.00	.....	.....
Baltimore, del.	28.60	.....	.....	.....
Steelton, Pa., base	.....	27.00	.....	.....
Swedeland, Pa., base	27.50	27.00	28.50	28.00
Philadelphia, del.	28.43	27.93	.....	28.93
Toledo, O., base	26.50	26.00	27.00	26.50
Youngstown, O., base	26.50	26.00	27.00	26.50
Mansfield, O., del.	28.66	28.16	29.16	28.66

•To Neville Island base add: 55 cents for McKees Rocks, Pa.; 84 cents, Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97 cents (water), Monongahela; $1.11, Oakmont, Verona; $1.24, Brackenridge.

Exception to above prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic,. bessemer and malleable pig iron.

High Silicon, Silvery

6.00-6.50 per cent (base) $32.00
6.51-7.00..$33.00 9.01- 9.50. 38.00
7.01-7.50.. 34.00 9.51-10.00. 39.00
7.51-8.00.. 35.00 10.01-10.50. 40.00
8.01-8.50.. 36.00 10.51-11.00. 41.00
8.51-9.00.. 37.00 11.01-11.50. 42.00

Fob Jackson county, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Electric Furnace Ferrosilicon: Si 14.01 to 14.50%, $48 Jackson co.; each additional 0.50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 P, 0.40 Si, 1.0% C, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Semi-cold blast, low phosphorus.

Fob furnace, Lyles, Tenn., $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $26.00
Valley base 25.00

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $32.00 base; $33.38, del. Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, $29.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Refractories

Per 1000, fob shipping point. Net prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $76.06

High Heat Duty

Pa., Ill., O., Md., Mo., Ky. 60.40
Ala., Ga. 60.40
N. J. 65.90

Intermediate Heat Duty

Ohio 50.60
Pa., Ill., Md., Mo., Ky. 54.80
Ala., Ga. 49.15
N. J. 57.65

Low Heat Duty

Pa., Md., Ohio 42.35

Malleable Bung Brick

All bases 70.45

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press 36.45
Wire Cut 34.15

Silica Brick

Pennsylvania 60.40
Joliet, E. Chicago 69.30
Birmingham, Ala. 60.40

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.
Bulk 22.00
Bags 26.00

Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick 54.00
Chem. bonded chrome 54.00
Magnesite brick 76.00
Chem. bonded magnesite 65.00

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net ton, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

Ferroalloy Prices

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Spiegeleisen: 19-21% carlot per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Chromium Metal: 97% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; fob shipping point, freight allowed.

Ferrocolumbium: 50-60% per lb contained columbium in ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices up 10 cents.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; **high carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

Low carbon, eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points. **Low carbon, high nitrogen:** Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Special Foundry Ferrochrome (Cr 62-66%, C about 5-7%): Contract, lump, packed, eastern zone, freight allowed, c.l. 15.60c; ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

S. M. Ferrochrome, high carbon (Cr 60-65%, Si, Mn and C 4-6% each): Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Prices are per lb of contained chromium; spot prices 0,25c higher. Deduct 0.55c for bulk carlots.

S.M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

SMZ Alloy: (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

Silvaz Alloy: (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 0.25c.

CMSZ Alloy 4: (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c: less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

CMSZ Alloy 5: (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c, 13.00c, central; 13.25c, 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

Ferro-Boron: (B 17.50% min., Si 1.50% max., Al 0.50% max. and C 0.50% max.) per lb of alloy contract ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central; $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot and 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, carlot, lump 13.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

Briquets Ferromanganese: (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

Briquets, Ferrochrome: Containing exactly 2 lb Cr, packed, eastern zone, c.l. 9.50c, ton lots 9.80c, less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb of briquets; spot prices 0.25c higher.

Silicomanganese, containing exactly 2 lb Mn and about ⅛ lb Si, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots.

Ferrosilicon, weighing about 5 lb and containing exactly 2 lb Si, or about 2½ lb and containing exactly 1 lb Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are f.o.b. shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

Ferromolybdenum: 55-75% per lb contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher. Deduct 0.85c for bulk carlots.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l., 12.90c; 2000 lb to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

Ferrotungsten: Spot 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Bortam: B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

Ferrovanadium: Va 35-55%, contract basis, per lb contained Va, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: Zr 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

Zirconium Alloy: Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 5.88c; ton lots 6.38c; less 6.88c. Spot up ½c.

Siminal: (Approx. 20% each Si, Mn, Al) Contract, freight not exceeding St. Louis rate allowed, per lb alloy; carlots 8c; ton lots 8.75c; less-ton lots 9.25c.

Borosil: 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25
Cast Grades (Fob Shipping Point)	
Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices)	
No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstripped Motor Blocks	17.50
Stove Plate	19.00

BOSTON:

(Fob shipping points. Boston differential 99c higher, steelmaking grades; Providence, $1.09 higher)	
No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

BUFFALO:

(Delivered consumers' plant)	
No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

PITTSBURGH:

(Delivered consumers' plant)	
Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	*20.00
Heavy Breakable Cast	*16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

* Shipping point.

CLEVELAND:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

VALLEY:

(Delivered consumer's plant)	
No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD:

(Delivered consumer's plant)	
Machine Shop Turnings	$15.00

CINCINNATI:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
Machine Turnings	10.50-11.00
Shoveling Turnings	12.50-13.00
Cast Iron Borings	11.50-12.00
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-22.00
Scrap Rails	20.50-21.00
Stove Plate	18.50-19.00

DETROIT:

(Delivered consumer's plant)	
Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

CHICAGO:

(Delivered consumer's plant; cast grades fob shipping point; railroad grades fob tracks)	
No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Rerolling Rails	22.25
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

ST. LOUIS:

(Delivered consumer's plant; cast grades fob shipping point)	
Heavy Melting	$17.50
No. 1 Locomotive Tires	21.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50
Shoveling Turnings	12.50
Rerolling Rails	21.00
Street Car Axles	24.50
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Cupola Cast	20.00
Charging Box Cast	19.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25

BIRMINGHAM:

(Delivered consumer's plant)	
Billet Forge Crops	$22.50
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	11.00
Cast Iron Borings	13.00
Iron Car Wheels	20.00

LOS ANGELES:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Dlr. Bundles	12.00
Machine Turnings	5.50
Mixed Borings, Turnings	5.50
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	17.00
No. 1 Busheling	17.00
No. 1, No. 2 Bundles	17.00
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate 1 ft and under	18.00
Alloy-free Turnings	7.00
Tin Can Bundles	14.50
No. 2 Steel Wheels	21.50
Iron, Steel Axles	24.00
No. 2 Cast Steel	20.50
Uncut Frogs, Switches	18.00
Scrap Rails	18.50
Locomotive Tires	20.50

SEATTLE:

(Delivered consumer's plant)	
No. 1 Heavy Melt. Steel	$14.12
No. 2 Heavy Melt. Steel	14.12
Heavy Railroad Scrap	14.50
(Fob shipping point)	
No. 1 Cupola Cast	20.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 14.37½c, del. Conn.; less carlots 14.50c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½c, refinery, 20,000 lb or more; 14.37½c, less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 15.25c; 88-10-2 (No. 215) 18.50c; 80-10-10 (No. 305) 18.00c; No. 1 yellow (No. 405) 12.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 9.50c, select 9.60c, brass special 9.75c, intermediate 10.00c, high grade 10.50c, E. St. Louis, for carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.40c; under 2000 lb 0.50c.

Lead: Common 9.35c, chemical 9.45c, corroding, 9.45c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 11.25c; No. 12 foundry alloy (No. 2 grade) 11.00-11.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 12.50c; grade 2 (92-95%) 11.50c; grade 3 (90-92%) 10.00-10.25c; grade 4 (85-90%) 9.50-9.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, fob refinery 35.00c lb; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

Mercury: Open market, spot, New York, $101-$103 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be, $14.75 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb, del.; anodes, balls, discs and all other special or patented shapes 95.00c per lb delivered.

Cobalt: 97-99%, $1.50 lb, for 550 lb (bbl.); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y. 70.625 per ounce.

Platinum: $67-$70 per ounce.

Palladium: $24 per troy ounce.

Iridium: $125 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 25.81c; yellow brass 23.67c; commercial bronze, 95% 26.14c, 90% 25.81c; red brass, 85% 24.98c, 80% 24.66c; best quality 24.38c; phosphor bronze, grade A 4% or 5%, 43.45c; Everdur, Duronze or equiv., hot rolled, 30.88c; naval brass 28.53c; manganese bronze 31.99c; muntz metal 26.78c; nickel silver 5% 32.38c.

Rods: Copper, hot rolled 22.16c, cold drawn 23.16c; yellow brass 18.53c; commercial bronze, 95% 25.83c, 90% 25.50c; red brass, 85% 24.67c; 80% 24.35c; best quality 24.07c; phosphor bronze, grade A 4% or 5% 43.70c; Everdur, Duronze or equiv. cold drawn, 29.82c; naval brass 22.59c; manganese bronze 25.93c; muntz metal 22.34c; nickel silver 5% 34.44c.

Seamless Tubing: Copper 25.85c; yellow brass 26.43c; commercial bronze 90% 28.22c; red brass 85% 27.64c, 80% 27.32c; best quality brass 26.79c; phosphor bronze, grade A 5% 44.70c.

Copper Wire: Bare, soft, fob eastern mills, carlots 19.89c, less carlots 20.39c; weatherproof, fob eastern mills, carlot 22.07c, less carlots 22.57c; magnet, delivered, carlots, 23.30c, 15,000 lb or more 23.55c, less carlots 24.05c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 11.25c; cut sheets 11.50c; pipe 9.90c, New York, 10.00c, Philadelphia, Baltimore, Rochester and Buffalo, 10.50c Chicago, Cleveland, Worcester and Boston.

Zinc Products: Sheet fob mill, 13.15c; 36,000 lb and over deduct 7%; Ribbon and strip 12.25c, 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lb 12.50c; 100-500 lb 13.00c; under 100 lb 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

PLATING MATERIALS

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

Copper Anodes: In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 25.125c; curved, 20.375c; round oval straight, 19.375c; electro-deposited, 18.875c.

Copper Carbonate: 52-54% metallic Cu, 250 lb barrels 20.50c.

Copper Cyanide: 70-71% Cu, 100-lb kegs or bbls 34.00c, fob, Niagara Falls.

Sodium Cyanide: 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

Nickel Anodes: 500-2999 lb lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb kegs or 275-lb bbls 18.00c lb, del.

Tin Anodes: 1000 lb and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb bbls 39.00c fob Grasselli, N. J.; 100-lb kegs 39.50c.

Sodium Stannate: 100 or 300-lb drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb kegs or bbls 33.00c fob Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	12.000	12.000	11.250
Yellow brass	9.875	9.625	9.125
Commercial bronze			
95%	11.250	11.000	10.500
90%	11.125	10.875	10.375
Red brass			
85%	10.875	10.625	10.125
80%	10.875	10.625	10.125
Best quality (71-79%)	10.500	10.250	9.750
Muntz metal	9.250	9.000	8.500
Nickel silver, 5%	10.500	10.250	5.250
Phos. br., A, B, 5%	12.750	12.500	11.500
Naval brass	9.500	9.250	8.750
Manganese bronze	9.500	9.250	8.750

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¾c for shipment of 60,000 lb of one group and ½c for 20,000 lb of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 11.50c; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50c

(Group 2) Soft red brass and borings, aluminum bronze 10.75c; copper-nickel solids and borings 11.00c; lined car boxes, cocks and faucets 9.50c; bell metal 17.25c; babbitt-lined brass bushings 14.75c.

(Group 3) Admiralty condenser tubes, brass pipe 8.75c; muntz metal condenser tubes 8.25c; old rolled brass 8.25c; manganese bronze solids: (lead 0%-0.40%) 8.00c; (lead 0.41%-1%) 7.00c; manganese bronze borings, 7.25c.

Aluminum Scrap: Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb, 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50c, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb borings and turnings one cent less than segregated.

Lead Scrap: Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.75c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.75c, fob point of shipment, add ½c for 10,000 lb or more. New die cast scrap 4.95c, radiator grilles 4.95c, add ½c for 20,000 lb or more. Unsweated zinc dross, die cast slab 5.80c, any quantity.

Nickel, Monel Scrap: Prices fob point of shipment; add ½c for 2000 lb or more of nickel or cupro-nickel shipped at one time and 20,000 lb or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 23.00c; 90-98% nickel, 23.00c per lb nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb contained nickel, plus 8.00c per lb contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Certified orders, notably for galvanized, disrupts schedules as consumers press for deliveries

Sheet & Strip Prices, Page 154

Philadelphia — Tonnage being certified in sheets, notably for September delivery, will dislocate considerable volume scheduled and increases the carryover. In the matter of sinks for the housing program, this involves enameling stock on which schedules are crowded; certified priority orders have been imposed on three mills, one in the Philadephia area. Calvanized sheets, output of hot-dipped being relatively low with most producers, are also being certified in substantial volume, with other grades to less degree. Some of these are for new tonnages from fabricators apparently letting out work with no orders on current mill backlogs. Third quarter schedules thus will be subject to revisions and this in turn will affect fourth quarter. Mills are taking practically no new firm orders striving to straighten out schedules, difficult in view of third quarter volume which may still be subject to certification, which in the East revolves around housing largely. There is slight easing of pressure for tonnage due buyers, but a material decline in efforts to place new business in view of producers' determination to clear up present commitments.

New York—Certified orders under Direction 12 center mostly in galvanized sheets and for September will be substantial enough to affect numerous orders in other categories; high ratio of certifications is against existing volume, including some strip. New orders are slow, there being no place or openings for this tonnage with mills sold beyond this year and carryovers heavy, notably in light gages of cold-rolled. Openings are expected in No. 18 gage and heavier hot-rolled first, possibly in late year. Although policies differ and all mills are on some form of quota and allocation base, efforts are aimed at keeping carryovers down as much as possible with high production; for instance, one large producer will utilize October to make up delinquent tonnage, not having scheduled for fourth quarter, leaving only two months for open tonnage in that period. In spots, requests for deferments in shipments are appearing in flat-rolled; in some cases plants are down or on reduced schedule, but the question of earlier duplicate ordering in sheets and strip comes up.

Cleveland — Pressure for sheet and strip deliveries has eased somewhat, consumers apparently sensing impossibility of hastening deliveries. The tightness of flat-rolled steel is expected to continue for another twelvemonth as general industrial expansion will bring further demand. Fabricators of new products who are not on mill books are handicapped in efforts to obtain steel. An instance recently was an Oakland, Calif., manufacturer who came to Cleveland in search of ten tons of galvanized sheets of any standard size for a new product but was unable to fill his needs. The suggestion was made that he seek aluminum sheets as a substitute.

Cincinnati—Sheet mills find priority

tonnages, for critical housing and farm machinery programs, have not dislocated schedules to a marked degree. It is possible, however, that heavier deliveries to jobbers will delay movement of sheets direct to manufacturers. Mills in this district are holding the price line despite lapse of OPA.

Boston — Concentrating on backlog tonnage, mainly two to three months behind schedule, new volume in flat-rolled is at a minimum. Production of narrow cold strip is low and, although some shipments of hot strip to rerollers are beginning, not for another month will inventories be sufficiently balanced to take up schedules with any stability. Meanwhile production will undergo further revisions to make up as much as possible against mounting carryovers. Some sheet tonnage, notably galvanized, is being certified for housing. Tonnage involved, which is relatively light, is at expense of general buyers. Possibility of duplicate buying in flat-rolled is uncertain but the general opinion is that it is not large in this area. Springfield armory is inquiring again for cold strip, 1010 grade, but as much of the material is wanted for July and August, bids are lacking. For weeks this consumer has been trying to place cold strip tonnage.

Birmingham—Sheets have evidenced little change and mills report no marked flurry of buying even under certifications. Bookings already were solid for the year with a marked shortage inevitable into possibly second quarter of 1947. A relatively good tonnage of cotton strips is being produced.

Pittsburgh—Sheet producers continue to follow a policy of watchful waiting, pending definite decision on price regulations by Congress. The industry believes it is justified in raising prices moderately to offset increased costs not compensated under former OPA ceilings and since June 30 production costs have risen still further. A rise in lead prices will affect cost of producing long ternes. Increase in zinc prices will affect galvanized sheet production costs.

Sheet and strip production is back to normal but most producers do not anticipate much easing through the remainder of this year. Certified tonnage under Direction 12 to M-21 is falling heaviest on galvanized sheets. These certified orders and the increased warehouse load will represent about 20 per cent of third quarter sheet and strip output, with galvanized as high as 50 per cent in some instances.

Portsmouth Steel Corp. Given Base Prices on Steel

Washington—OPA has authorized the following prices to Portsmouth Steel Corp. On sales to Kaiser-Frazier, and Graham Paige, on sheets for which Portsmouth has paid Wheeling Steel Co. a conversion charge, hot-rolled, 2.42½ f.o.b. Steubenville, O.; cold-rolled, 3.27½ f.o.b. Steubenville. In cases of sales to Wheeling, carbon rerolling slabs, $42.78 per gross ton f.o.b. Portsmouth, O.; carbon rerolling ingots, $36.78 per gross ton, f.o.b. Portsmouth; on electrical sheet bars to Wheeling, field grade, $46; armature grade, $48; electrical, $53; motor special, $55; motor grade, $58; dynamo, $60.50; transformer, $63; transformer special, $65.50. On all other sales, the price will be the Pittsburgh

price, f.o.b. Portsmouth, effective as of the date of the order, which was about May 28 or 29.

Steel Bars . . .

Little capacity for this year available but some large sizes can be booked for late delivery

Bar Prices, Page 154

New York—Only larger sizes of cold-finished carbon bars and alloys are available for fourth quarter. Demand is centered strongly in smaller sizes of carbon bars, one and one-eighth inch and under, reflecting the turn from heavier war goods to normal civilian production, notably screw machine products; carryover into next year in these size ranges will be heavy. Demand for alloys lags far behind that for carbon and hot-rolled deliveries can be made in August.

Boston—Only few mills can take orders for delivery this year, although some openings are available for ⅝ to three-inch cold-drawn for December delivery. Below ⅝-inch even cold-drawn alloys are extended through fourth quarter. Only on larger sizes is the Hartford, Conn., mill able to make delivery on cold-drawn this year. Turned and ground rounds, hexagons, flats and squares are sold out, with producers taking no firm orders as a rule for next year. Fabricators are short of bars, with inventories out of balance, but are more concerned with getting tonnage due, than in placing new orders. They would place contingent advance orders, if possible, but are pressing for overdue tonnage. Although demand for larger sizes of carbon bars is not as heavy as for smaller, buying nevertheless has been substantial.

Cleveland—Although there still is a shortage of carbon bars, that condition is expected to be eased to some extent by the end of 1946. Alloy bars are in freer supply, with one producer reporting ability to give delivery in that grade in 60 days.

St. Louis—Demand for merchant bars continues heavy. Mills have orders for all first quarter and well into second. Allocations are likely to continue well into next year. Some slackening in buying is noted, attributed to delayed deliveries, but total demand is increasing. New buying is being discouraged as much as possible, only indefinite deliveries being promised. Some mill space for reinforcing bars is open for November, but steel for this purpose is uncertain.

Philadelphia—Bar mills are filled into first quarter on small sizes of carbon stock and for most part on cold-drawn alloys in the same ranges. Some large cold-drawn are still available this year, also hot-rolled alloys for August shipment. Alloy demand is not impressive and there are relatively few substitutions of that grade for carbon screw machine products and the trend in these sizes in forge shops is reflected in almost complete shift of fabricators to civilian work.

Steel Plates . . .

Better production indicates reduction of backlogs but demand continues high

Plate Prices, Page 155

New York—Plate carryovers will extend well into first quarter in most cases and some orders are being taken for delivery next year. Export buying is also substantial. Given steel and steady high production over the next few months, some openings may appear late this year, although this is by no means assured. Tank fabricators are pressing for tonnage, also for heads. Floor plates are available for fourth quarter delivery, some in late third. Shipbuilding is taking less steel, but two 920-foot fast passenger liners are up for the Maritime Commission, while repairs and reconversions account for moderate lots. Bath Iron Works, with contracts for 32 beam trawlers for the French, postponed laying keels for first three from July to September at Bath, Me.

Boston—Plate mills are now rolling real tonnage and some foresee a material dent in heavy backlogs before end of the year, which may bring some spot openings for fourth quarter; not in narrow universal plates but in some of the more extreme light and heavy gages. Thus far, this is not showing up in substantially heavier deliveries, but is expected to do so by end of this month. In smaller range of sizes, this may depend on how soon some black sheet mill capacity is open for rolling light

plates. Production of black sheets is also mounting, in some cases higher than expected, and there is hope some of this capacity may become available before end of year. With head deliveries ranging from six months and beyond, major problem for tank fabricators is to coordinate plate and head supplies.

Seattle—Demand for plates is well sustained by a large volume of small contract involving 10 to 50 tons, mainly for boilers and high-pressure tanks. In some instances bidding has been restricted by difficulty in obtaining materials, inventories being far below normal. The largest pending tonnage involves 5500 tons for 12 pump discharge pipes at Grand Coulee, Western Pipe & Steel Co., San Francisco, being low bidder.

Birmingham—Plate demand continues good. Tank manufacture and a considerable amount of shipbuilding and repairs accounting for all the tonnage available.

Cleveland—Plates are almost as difficult to obtain as sheets and strip because sheet mills that could roll plates are needed for rolling sheets. Considerable inquiry for plates has been received from tank and car builders.

Philadelphia — Producers are taking some firm orders for 1947 as they are filled on all grades for this year, including welding quality tank steel, fire box and flange. Many fabricators using plates do not appear to be desperately short. This may and probably does reflect duplicate orders placed months ago. Demand for tank plates and heads is high. The matter of tonnage in some products is shown in selectivity in plate acceptances, as in other products, producers taking in only 15 to 20 per cent in light gages. Volume in 3/16 and ¼-inch is going begging for shipment before first quarter, at least.

Wire . . .

Output better but supply of rods short. Nails are still far below needs

Wire Prices, Page 155

Pittsburgh—It will take a full year of solid production to build jobbers' and dealers' stocks of merchant wire up to normal. In addition to unfavorable price relationship in wire items, annealing and galvanizing equipment represents a bottleneck. Some nonintegrated wire producers are operating only three to four days a week, due to critical wire rod shortage.

Nail requirements for this year will approximate 749,000 net tons, according to CPA, and in 1947 demand will amount to 835,000 tons. This compares with current annual production rate of 600,000 tons, 642,000 tons in 1945, and 800,000 tons in 1943. Out of the estimated nail requirements for 1946 and 1947, veterans' housing needs alone will require 248,000 and 312,000 tons respectively. Demand for boxing and crating nails has been particularly heavy in recent months.

Cleveland—Wiremakers see no near possibility of working out from under their heavy load of orders, for as industry in general quickens, demand for wire increases. One example is spring wire which would be in still heavier demand

if the automobile industry were operating at capacity. A boon to wire production will be resumption July 15 of operations by one producer, closed two weeks for vacation. Although wire producers report they need higher prices no increases have been indicated.

New York—Production of drawn wire is rebounding slowly after sharp decline in output in the East. Progress is retarded by tightness in rods, which stems back to raw materials for steelmaking in some cases. Sold through this year on many products, although some mills have scattered openings for music wire, fourth quarter, producers generally are making little progress in maintaining schedules on allocations and most are taking but a fraction of new volume offered. Pressure for wire for the automobile industry, including valve spring and cushion, is unabated. Welding and rope wire demand is far below peak, but the slack has been more than taken up by other products. Increases in prices for numerous marginal products on which production has been light, is expected. Prices have kept down production of these, but better profit margins would contribute toward a better balance in backlogs.

Chicago—Despite higher production rates at wire mills since the coal strike ended, demand for manufacturers and merchant products continues heavy. Consumers are pressing for prompt delivery. Gradually improving mill shipments is enabling some manufacturing plants to increase operations or resume from shutdowns. Some others are expecting to have sufficient inventories by July 15 that they can resume.

Boston—Production is off sharply in the Worcester district, lowest in recent years, with American Steel & Wire Co. down earlier this month. Recovery may be slow in view of the tightening rod supply. Wire mill scheduling is due for another wave of revisions, as has been the rule for some months. Pressure for drawn wire is unabated with numerous fabricators short. Move is under way for heavier nail production and some of the lower margin products on which production has been low, may go up if price adjustments are made. However, third quarter will be well under way before wire production again is in high on a broad scale.

Birmingham—While anticipating considerable easing in wire products, especially nails, by the end of the summer, prospects for immediate relief are not good, some observers predicting little bettering before next year. Demand for wire, especially nails and fencing is reported in some quarters as at all-time peak.

Structural Shapes . . .

Shape demand large but CPA limitations hold back many awards

Structural Shape Prices, Page 155

New York—Closing July 31, West Side elevated highway section, Barclay to Cedar street, Manhattan, takes 4000 tons. Oustanding also are requirements for the Abraham Lincoln housing project, New York, 5000 tons. Smaller non-housing construction projects are increasingly affected by tightening in authorizations; district office approved 39 projects, valued at $961,194, and denied 18 applications, $250,761, for the week ending July 3. Although fabricating shop backlogs are heavy, availability of plain material is the major factor in structural deliveries. After one interruption in the Pittsburgh district, structural mills, with more semifinished allotted, are rolling in high volume again, but in view of heavy backlogs, few spot openings are likely to appear before first quarter, notably on smaller sizes.

Boston — Estimates on 5340 tons, largest bridge inquiry this year, closing July 25, is for structures on the Kittery-Portland section of the Maine Turnpike. Smaller spans, notably in Connecticut, bring pending bridge tonnage in excess of 6000 tons; several hundred tons have been awarded for Vermont highways. Slades Ferry bridge contract for Fall River, Mass., is mostly floor grating, 17,000 square feet. Building construction is reflecting the ban on nonhousing, although industrial expansions, 100 to 300 tons, on which district fabricating shops depend mostly still comes out in fair volume and are generally authorized. Hangar at Logan airport, Boston, takes 300 tons. Fabricated material deliveries range into February for larger tonnages with shops having heaviest backlogs, but district fabricators, by filling in from disappearing stocks, are in much better position as to deliveries. Escalator

clauses apply to most forward work.

Birmingham — Fabricators are well booked into next year, although some slackening of new inquiries is reported. Highway work, however, is likely to renew the pressure and delays are expected since little new commitments will be made before first quarter.

Seattle—Fabricating shops have considerable backlogs but are unable to take much additional business in the face of diminishing inventories. Deliveries under allocations are far short of requirements. War Surplus stocks have provided some relief but this source is dwindling. Better shipments from eastern mills are expected soon. Isaacson Iron Works, Seattle, is fabricating 1500 tons for the Weyerhaeuser Timber Co., Longview, Wash., and 350 tons for the Securities Bldg. addition, Seattle.

Philadelphia — Structural mills are producing heavier volume than had been expected and are well above rated capacity in some instances. Nevertheless, structural backlog is large, in smaller sections especially, and few openings for spot tonnage are expected before first quarter. Inquiry for fabricated structural steel is off, reflecting the ban on nonhousing projects, although a fair volume is up for bridges. No orders for next year are being taken for shapes, in view of the uncertain carryover.

Pig Iron . . .

Producers spread tonnage thinly to serve most melters but foundries operate at reduced rate

Pig Iron Prices, Page 157

New York—If the demise of OPA becomes final, application of the retroactive price billings on tonnage shipped since May 29 is uncertain. That an increase in prices is warranted in view of higher coke, ore and other costs is evident. Furnace production and deliveries are improving, although retarded in some directions by limited coke supply. Currently available tonnage is distributed so broadly and thinly there is slight easing in pressure for iron in any direction. Two additional furnaces are producing in the Buffalo area for the merchant trade, but slight contribution is expected from integrated steel works stacks until basic supplies are built up. Although applications for certified tonnage have been few, these are expected to be heavier during second half of third quarter. Numerous foundries continue on restricted schedules and some are still down.

Pittsburgh—CPA pig iron certification program, effective July 12 and applying to August and September production, will result in real hardship among many foundries here for certified tonnage is expected to absorb more than half the present capacity output of merchant producer here. The critical pig iron shortage expected through the summer months not only will adversely affect production of many foundries not coming within the scope of the allocation order, but output of nonintegrated wide plate producers and ingot mold manufacturers also will be affected. It will take at least two months to bring the high cost units, now idle, back into operation; and this program temporarily is held up until some subsidy program can be worked out either through a revised OPA measure or some other procedure, possibly with RFC. Until this is accomplished no substantial improvement in overall pig iron supply is indicated.

The merchant producer here has made no move in establishing its pricing policy during the interim, pending final action on price controls by Congress. This interest in invoicing gets customers at OPA ceilings but subject to reinvoice along lines permitted the latter part of May by OPA. Should price controls be definitely discarded an advance of $2.50 or more a ton in pig iron is expected to offset increased freight rate charges on its raw materials, and higher iron ore and coke prices.

Buffalo—Foundry expansion is checked by pig iron shortage but foundries are seeking more workers as well as iron. Confusion still prevails over prices but merchant iron sellers report foundries pressing for shipments, with prices secondary. Pig iron production reached 81 per cent last week as Republic Steel Corp. blew in an additional stack.

Boston—While the pig iron shortage remains critical, low phos is probably in tightest supply. Deliveries are slightly heavier and with melt reduced by widespread suspensions during the first half of this month, consumers are striving to accumulate inventories sufficient to resume at partial capacity. So many are

low on iron, however, current supply is spread thin, and slight chance is seen for building up safe margins this quarter. Delivery schedules will also be subject to revisions after Aug. 1 when certified orders for castings needed for the housing program appear; these may be expected from stove manufacturers and others supplying household goods.

Philadelphia—Important as prices are production and distribution are the leading factors in pig iron, with all consumers critically short. Several eastern steelworks, already topheavy with scrap in their melts, are confronted by curtailment in production unless more iron is forthcoming. Slight improvement in deliveries is spread so thin that pressure for tonnage is not easing. Shipping schedules and production will be affected in the last two months of this quarter by certified tonnage, now appearing in heavier volume. Blast furnaces are shifting frequently from grade to grade to meet the situation. Production losses earlier in the year now are being felt to the extent predicted.

Birmingham—The pig iron shortage continues. Higher prices announced last week have been accepted generally, according to reports, but there is nothing to indicate easing of the shortage until demand slows, since additional capacity is not available. Sloss Sheffield, it is understood, will take its North Birmingham stack off of ferro in the near future.

Seattle—Pig iron is tight and no deliveries are expected this month. Buyers are forced to take what is offered and present shipments are taken mainly from stock piles, too low in quality to be saleable in ordinary circumstances. No pig iron is coming from eastern makers. With Geneva and Fontana both in operation the situation is expected to improve. The coke situation has eased and foundry supply is better. Canadian coke usually is available but consumers prefer eastern fuel, which is arriving in small shipments under allocation.

Chicago — While higher pig iron prices are believed to be in the offing, an increase having been in the making when OPA ended, no move has been made so far. The $3 and $4 advances announced by makers of southern iron have not so far been reflected in iron delivered into this area. Of the district's 41 blast furnaces, 36 are in operation, but merchant iron is reduced by the need of steel plants for hot metal, as a result of scrap shortage.

Cincinnati—The pig iron price situation continues confused. Melters are accepting shipments, subject to whatever adjustments may be necessary later. The movement of iron into this district still falls below prestrike levels. Lack of raw materials plus vacations combine currently in holding the melt down. Iron supplies to a district mill are insufficient to enable building of reserve.

Scrap . . .

Some cast grades reported selling $2.50 to $3 above OPA ceiling, steel grades holding

Scrap Prices, Page 158

Pittsburgh—First definite break in the scrap price line appeared last week with cast grades reported moving at $2.50 to $3 per ton above OPA ceilings in some other districts.

Shippers of scrap who recently have been holding back for expected upward price adjustment are not likely to deliver scrap on new orders until the confused OPA situation clarifies. Some dealers are reported to be paying $1 to $2 above former price ceilings for unprepared material. Many dealers undoubtedly are holding back on shipments in the hope of obtaining higher prices, but this tonnage is said to represent but a small part of the overall supply.

Consumers are actively seeking scrap tonnage at former OPA price ceiling. One large mill here has gone on record to the effect it will not pay above ceiling prices. As far as can be determined, no significant tonnage has moved at higher prices.

Should no material improvement in the movement of scrap develop within the next 30 days, some steel plants will have to begin curtailing operations.

Boston—Steelworks as well as foundries are forced to dip deeper into reserves of scrap to maintain melt, sometimes on reduced schedules, due to critical shortage of pig iron. Ratio of scrap to iron is highest ever melted by many. Both steelmaking and foundry grades are coming out slowly with some held back for clarification of prices. Industrial scrap production is not improving, in fact has been lower during the

last two weeks. Yards are not getting enough unprepared to maintain operations at normal rates. In no case where consumers are down have shipments been held up, but deliveries are slow.

New York—Movement of scrap has been light and some tonnage held back for price clarification, including railroad material. Supply of both steelmaking and cast grades is light. On what little volume is done, ceiling prices have generally held, although in cast some under-counter sales at higher prices are rumored. Steel mill buyers, however, gave signs of resisting any pressure for higher prices.

Detroit—Most sellers and brokers are adhering to OPA ceiling prices on iron and steel scrap. A few dealers are reportedly holding back some small quantities but there is no general trend in this direction. Supplies continue scanty, and the trade is mytified over the light tonnages of production scrap yet appearing from motor plants, even though production of cars and trucks has totaled close to 250,000 for each of the past three months. Probable answer is that the entire nation's scrap supply was depleted in the war years. Some steel mills are contemplating moving their pig iron ratios in open hearths as high as 80 per cent in view of the scrap drouth. Ford open hearths are reported approaching the desperate stage in scrap requirements.

Cincinnati—Prices of iron and steel scrap are, in general, holding to the OPA level pending the question of control. However, some tonnage is being withheld from the market because of unsettled conditions. An occasional lot may be moving with a proviso that the price be established in accord with later developments.

Cleveland—Scrap inventories continue to decline as supply remains small and melters are forced to dip into reserves to maintain steelmaking rate. Industrial production has not yet attained anything like normal proportions and is not expected to until flow of steel from mills to fabricators is in better volume. Industrial scrap producers are selling their accumulations normally but some dealers are believed to be holding back shipments in hope of higher prices. Prices in the main are holding at former OPA ceilings as it is not believed higher quotations will produce sufficient material to make them worth while.

St. Louis—Scrap dealers are waiting for a decision on OPA, with shipments about 75 per cent under normal. Principal movement is in railroad scrap, though a little of all grades is coming out. Brokers are unable to fill commitments but mills are not pressing as reserves average 90 days or better, with foundry stocks about 60 days, best in months. Most pressure here is from Chicago where need is great.

Birmingham — Scrap is practically unavailable. Brokers report dealers are waiting to see what happens in OPA. Meanwhile, they are holding supplies and the scarcity is becoming a threat to steel production. OPA ceilings are being offered but brokers are getting no scrap. The Navy disposed of 800 tons of heavy melting at Charleston, S. C., July 10.

Buffalo—Scrap consumers are alarmed by rapid depletion of scrap reserves as ingot production is maintained. With light receipts mills are expected to start reductions in operations soon. Some dealers have resumed shipments to consumers at old prices, but tonnage is small. So far there has been no confirmation of sales above OPA levels. Water receipts included 5000 tons by the canal and 5000 tons by lake from Duluth.

Chicago—Perhaps a little more scrap moved to mills last week but in general the situation is pretty much stalemated by uncertainty over the future of OPA. Consumers continue to offer ceiling prices and sellers also adhere on what material they sell. Meanwhile, owners of scrap prefer to hold accumulations pending outcome of the OPA issue. Stories are heard of dealers offering up to $2 above ceiling for this material but there is no evidence of over-ceiling transactions. Some railroads are moving out a little scrap, others are holding. Most steelmakers are dipping into shrinking inventories to maintain current operations, but if scrap does not increase shortly some cut in operatioon can be expected.

Philadelphia—Shipments from regular suppliers, including industrial producers, are holding up better than expected, although production in that field is still limited. Broker scrap shipments have slackened, indicating material is being held back for clarification of prices. A real shortage of scrap exists and while an increase in price will not actually produce more tonnage, some supplies in remote and now nonprofitable collecting areas might be released.

Warehouse . . .

Jobber stocks are far below needs though some gain is shown in mill shipments

Warehouse Prices, Page 156

Boston — Replenishment of depleted warehouse stocks is slow, although gradually mounting, with indications improvement will be substantial by mid-quarter. Surprisingly few orders are being certified to warehouse under direction 12. Warehouses have been steadily losing inventory and sales, the latter including substitutes in sizes and commodity. Structurals, light plates, sheets and small carbon rounds are about sold out with most. Back orders are also large, accounting for considerable tonnage yet to be received. Cold-drawn bars are in fair shape with some distributors, as are alloys, for which demand lags behind carbon stock.

Pittsburgh—Demand still is active, although an increasing number of consumers have become reconciled to fact steel is not available. A good proportion of these orders are from buyers who would normally purchase from mills. In most instances these consumers are combing warehouses without success for distributors have been limiting tonnage to customers of long standing.

Cleveland—Warehouse stocks remain badly out of balance, and distributors expect no early improvement. While stocks of some products are fairly good, others are exhausted, notably sheets of all grades. Demand for sheets remain so strong that shipments are sold as soon as shipped.One distributor reports that he has received mill cancellation of orders for structurals and cold-rolled small rounds for the rest of 1946. Otherwise, mill deliveries are running two to six months behind.

Los Angeles—Los Angeles warehouses in the main have not added the 4.2 per cent July 1 mark-up on alloy steels allowed by OPA, although the advance is felt to be fully justified. Had OPA control continued, it probably would have been added, spokesmen for some warehouses believe. Under present conditions buyers are likely to blame any rise on decontrol measures, it is felt.

Philadelphia—Deliveries to warehouse since steel mills resumed operations in volume have been disappointing but some improvement is promised over the remainder of this quarter. Meanwhile, during the first six months warehouses lost an average of more than 20 per cent of inventories, notably in carbon products in small sizes, on which demand is heaviest.

Tin Plate . . .

Tin Plate Prices, Page 155

Pittsburgh—Should projected capacity production of 900,000 tons of tin plate be reached this quarter, there likely will be some relaxation in present tin plate conservation measures for fourth quarter. Essential tin plate requirements for the third quarter are estimated at 800,000 tons, and on this basis producers are hopeful they will be able to meet other than essential food packing requirements late in this period. It is pointed out that demand for general line cans will readily take up mill capacity when seasonal food pack needs are met. Supply of tin cans is adequate to meet immediate canning requirements, but loss in tin plate production through first half is expected to result in shortage of cans during the peak of the canning season this quarter.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 155

Pittsburgh—Increase in bolt, nut and rivet prices granted by OPA equivalent to 12 per cent over the Oct. 1-15, 1941, levels will permit most producers to make a small profit. With few exceptions producers are not expected to increase prices further even should controls be permanently discarded, although this is said to be largely dependent on whether present production costs will be substantially increased.

Continued shutdown due to strikes at a number of plants and acute steel shortage forced a sharp curtailment through first half. Production prospects are better for the remainder of this year, but producers do not anticipate much relief from current steel shortage until late this quarter.

Iron Ore . . .

Iron Ore Prices, Page 156

Lake Superior iron ore movement in June was 18.52 per cent smaller than in June, 1945, totaling 8,654,437 gross tons, compared with 10,621,309 tons a year

ago, according to the Lake Superior Iron Ore Association, Cleveland. Details of the movement by ports are as follows:

Port	June, 1946	June, 1945
Escanaba	508,191	625,573
Marquette	436,874	556,905
Ashland	718,661	565,037
Superior	1,852,957	3,446,821
Duluth	2,064,895	2,838,259
Two Harbors	1,972,394	2,521,135
Total U. S. Ports	8,553,972	10,553,910
Michipicoten	41,225	67,399
Port Arthur	59,240	.....
Total Canada	100,465	67,399
Grand Total	8,654,437	10,621,309

Decrease from year ago, 1,966,872 tons, 18.52 per cent.

Cumulative movement to July 1 this year was 55.21 per cent less than to the same date in 1945, total tonnage being 13,000,454 tons, compared with 29,024,586 tons last year, a decrease of 16,024,132 tons. Details of the movement are as follows:

Port	June, 1946	June, 1945
Escanaba	577,685	1,883,154
Marquette	463,728	1,446,606
Ashland	835,008	1,757,234
Superior	3,303,654	9,177,971
Duluth	4,002,121	7,576,176
Two Harbors	3,551,899	7,010,491
Total U. S. Ports	12,734,095	28,851,632
Michipicoten	166,940	172,954
Port Arthur	99,419	.....
Total Canada	266,359	172,954
Grand Total	13,000,454	29,024,586

Decrease from year ago, 16,024 tons, 55.21 per cent.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3794 tons, penstocks, Spec. 1347, Loveland, Colo., for Bureau of Reclamation, to Darby Corp., Kansas City, Kans.; bids June 24.

3700 tons, bridge, Milan, Ill., for state, to Bethlehem Steel Co., Bethlehem, Pa.; bids June 7.

1200 tons, theater building, Mexico, to Virginia Bridge Co., Roanoke, Va.

750 tons, five buildings, Sacramento, Calif., for Campbell Soup Co., to Herrick Iron Works, Oakland, Calif.; Austin Co., contractor.

410 tons, fixed wheel gates, Davis Dam, Louise, Ariz., for Bureau of Reclamation, to American Bridge Co., Pittsburgh; bids June 5.

375 tons, addition for York Corp., York, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, 170-foot steel girder bridge, Hockanum river, East Ford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; A. I. Savin Co., Hartford, general contractor.

134 tons, switch yard, Spec. 1360, Grand Coulee dam, Odair, Wash., for Bureau of Reclamation, to Muskogee Iron Works, Muskogee, Okla.; bids July 2.

180 tons, building for Delaware Products Corp., Wilmington, Del., to Bethlehem Fabricators, Bethlehem, Pa.

100 tons, twin span steel beam bridge with skew span of 94' 1", Wallingford, Conn., to American Bridge Co., Pittsburgh; Arigoni Construction Co., general contractor.

STRUCTURAL STEEL PENDING

2275 tons, highway bridge, relocation of U. S. highway 66, Madison county, Ill., for U. S. Engineer, St. Louis; Bushman Construction Co., St. Joseph, Mo., low on general contract at $1,585,009; bids July 2.

5000 tons, Abraham Lincoln Housing project, New York; bids July 22.

4000 tons, elevated highway section, Barclay to Cedar streets, New York; bids July 31, borough president, Manhattan.

1000 tons, sheet piling, tunnel, Milwaukee, for Blatz Brewing Co.; bids July 16.

800 tons, power plant, Tampa Electric Co., Hookers Point, Fla.; Stone & Webster Engineering Corp., engineer-contractor.

410 tons, chemical plant, Shell Chemical Corp., Deer Park, Tex.; Stone & Webster Engineering Corp., Boston, engineer-contractor.

400 tons, state bridges, Connecticut; bids July 8.

400 tons, soldiers' home, Chelsea, Mass.

300 tons building for du Pont interests at Orange, Tex.

200 tons, transmission line towers and substation, Gulf State Utility Co., Texas; Stone & Webster Engineering Corp., Boston, engineer-contractor.

200 tons, state bridge, Cambria county, Pa.

180 tons, state bridge, Montgomery county, Pa.

175 tons, state bridge, Great Barrington, Mass.

170 tons, state bridge, Lancaster county, Pa.

135 tons, one 123-foot, seven one-quarter inch, steel girder bridge, Willimantic river, and one 78-foot, nine inch, girder bridge, over Central Vermont railroad, Coventry and Mansfield, Conn.; bids July 22, William J. Cox, state highway commissioner, Hartford.

Unstated, four radial gates, four hoists; bids to Bureau of Reclamation, Denver, July 29.

Unstated, two 100-ton, one 60-ton overhead traveling cranes; bids to Bureau of Reclamation, Denver, Aug. 1.

Unstated, one 20-ton overhead crane; bids to Bureau of Reclamation, Denver, July 24.

REINFORCING BARS . . .

REINFORCING BARS PLACED

250 tons, power house, Port Washington, Wis., for Milwaukee Electric Railway & Light Co., to W. H. Pipkorn Co., Milwaukee.

205 tons, telephone exchange building, Lewiston, Me., to Northern Steel Co., Boston.

125 tons, hangar, municipal airport, Chicago, for United Air Lines, to Truscon Steel Co., Youngstown, O.; Austin Co., Chicago, contractor.

110 tons, hospital barracks, Milwaukee, for government, to W. H. Pipkorn Co., Milwaukee.

100 tons, laboratory foundation, Milwaukee, for

Harnischfeger Corp., to Joseph T. Ryerson & Son Inc., Chicago.

REINFORCING BARS PENDING

4450 tons, also 150 tons miscellaneous metal, Sched. 1, 900 tons Sched. 2, Columbia Basin project; bids to Coulee dam Aug. 20.

1000 tons, expansion, Whiting, Ind., for Standard Oil Co. of Indiana.

850 tons, tunnel, Champaign, Ill., for University of Illinois; bids July 15.

385 tons, highway bridge, relocation U. S. highway 66, near Mitchell, Ill., for U. S. Engineer, St. Louis; Bushman Construction Co., St. Joseph, Mo., low on general contract at $1,585,009; bids July 2.

315 tons, state highway, Wilbur Cross parkway, Wallingford-Meriden, Conn.; bids July 8.

240 tons, highway, route 6, section 22A, Wayne-Totowa, Passaic county, New Jersey; bids July 22 to Spencer Miller jr., state highway commissioner, Trenton.

225 tons, highway, Wilbur Cross parkway, Meriden, Conn.; bids July 22 to William J. Cox, state highway commissioner, Hartford.

200 tons, MSG building, Decatur, Ill., for A. E. Staley Mfg. Co.; bids July 15.

200 tons, tunnel, Milwaukee, for Blatz Brewing Co.; bids July 16.

168 tons, substructure, Passaic river bridge, Clifton-Rutherford, N. J., also 15,162 linear feet, steel bearings piles; bids July 22 to Spencer Miller jr., state highway commissioner, Trenton.

180 tons, state highway, route 34, Derby-Orange, Conn.; bids July 8.

110 tons, expansion, Green Bay, Wis., for Fort Howard Paper Co.

100 tons, assembly plant, Flint, Mich., for Chevrolet Motor Division, General Motors Corp.

PLATES . . .

PLATES PENDING

5500 tons, 12 discharge pipes for Columbia Basin project; Western Pipe & Steel Co., San Francisco, low at $1,208,000.

475 tons, 6600 street light standards, Chicago, for Department of Streets and Electricity; bids July 1.

Unstated, three surge tanks, Fort Peck, Montana, project; Fegels Construction Co., Minneapolis, low to army engineer at $1,629,429.

Unstated, pipe for Forest Service; Beall Pipe & Tank Co., Portland, Oreg., low, $5591.

PIPE . . .

CAST IRON PIPE PLACED

1811 tons 12 to 4-inch water pipe for Everett, Bellingham and Seattle, Wash. to H. G. Purcell, Seattle for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

Unstated, 38,000 ft. 8 to 2-inch water pipe for Erland Point Water Co., Bremerton, Wash.; bids late July.

RAILS, CARS . . .

RAILROAD CARS PLACED

Georgia Power Co., for Atlanta, 60 trolley coaches to Pullman-Standard Car Mfg. Co., Chicago, and 60 to St. Louis Car Co., St. Louis.

Kansas City, 100 trolley coaches to J. G. Brill Co., Philadelphia.

Louisville & Nashville, 1250 fifty-ton all-steel hoppers, to Pullman-Standard Car Mfg. Co.

LOCOMOTIVES PLACED

Chilean State Railways, 12 steam locomotives, 5½-foot gage, 4-8-2 type, to Baldwin Locomotive Works, Philadelphia.

Finnish State Railway, ten steam locomotives, 2-10-1-type, to American Locomotive Co., New York.

Restore Commissions On Surplus Tools

WAA and Comptroller General restore payments to dealers handling machinery sales

Washington — Under an agreement arrived at between the War Assets Administration and the Comptroller General of the United States, Lindsay C. Warren, the former now is in a position to pay commissions due approved dealers on sales of government-owned machine tools and other production equipment.

Recently (STEEL, June 24, p. 176) the comptroller general ruled that commissions could be paid legally only to dealers who had been placed under contract prior to March 25 while the RFC's War Assets Corp. was in charge of surplus property disposal. Under the agreement now in effect, payments now also may be made without question on the part of the General Accounting office to dealers who were placed under contract since March 25 by the War Assets Administration.

In announcing this development, as a result of which commissions coming to several hundred thousand dollars will be paid immediately to approved dealers, Lt. Gen. Edmund B. Gregory, WAA administrator, made it clear that the agreement with the comptroller general authorizes payment of sales commissions up to and including June 30, the expiration date of existing contracts with approved dealers.

There will be no holding up of payments on sales made after that date, said General Gregory, since "the language now contained in the pending appropriation bill to be effective July 1 will remove any question of the standing of the dealer contracts during the fiscal year ending in 1947."

In view of this situation, General Gregory has directed WAA regional offices to renew approved dealer contracts for the year beginning July 1, and to execute contracts with additional approved dealers for the sale of machine tools and other production equipment.

With the matter of legality of the payment of commissions thus out of the way, the WAA is seeking ways and means of increasing sales of approved dealers. The experience of recent months has demonstrated thoroughly the effectiveness of the dealer method of selling capital equipment.

St. Louis — Deliveries on new machine tools of the larger and more expensive types are improving somewhat, while dealers note continued delays in the smaller and cheaper units. Such improvement as exists is attributed to the April price increase granted by OPA, which is only now being felt. Generally, prices are holding or dropping, rather than increasing. On very old equipment they are dropping sharply. Demand for both new and used tools remains constant despite resumption in flow of government surpluses into the market following a month's freeze.

Surplus tools constitute an estimated 75 per cent of sales here. Veterans are buying in considerable numbers and starting small machine shops. Dealers

are concentrating on this trade as a stopgap pending better deliveries on new equipment. Outlook for the new tool market here is termed good.

Boston—Disposal of surplus machine tools continues to influence orders for standard machines and without question numerous industries have bought used units at the expense of new orders, which are on the decline. Most industries are better tooled and some new orders have been placed to round out production lines which would otherwise been held back but for used machine purchases. On the other hand delays in getting into production on new products or expansions holds up some buying. Machine tool builders continue to get out new tools, notably refinements in special lines with the trend toward automatic operation and higher output. Export buying by Russia and France is active. Domestic backlogs are being reduced slightly in some lines. Reed-Prentice Corp. for $320,000 has bought the government plant used during the war for production of machine tool assembly and plastic injection machines.

Cincinnati—Machine buying in the last fortnight has tended toward dullness, an effect not inconsistent with vacations and uncertainties coming with lapse of OPA. Some interests report domestic business is reaching a volume equal to foreign sales

Pittsburgh — The generally muddled procedure and delay connected with the purchase of surplus equipment has discouraged prospective buyers, which leads observers to expect some congressional action soon aimed at speeding up distribution of such equipment.

Due to overall materials shortages, many metalworking companies have been forced to hold up expansion programs, and this has resulted in a reduction in new machine tools demand. Some producers report a decline in new orders of 20 to 25 per cent during June, and also some cancellations. Tool builders' order backlogs are extended 5 to 6 months on standard machines, but presses and specialty items cannot be obtained until February or March. Despite drop in new demand not much headway is expected to be made against order backlogs this quarter, for there is little prospect of tool builders substantially stepping up output, due to present acute shortage of steel and components.

Buffalo — While order backlogs for machine tools and machinery stretch for months, some builders note a falling off in buying interest, attributed to the vacation period. Sales representatives of the Buffalo Forge Co. meeting here were more concerned with meeting a flood of orders than with problems of promoting sales. Charles C. Cheyney, sales manager, reported "an enormous backlog of commercial ventilating and air-conditioning business." Amos G. Peterson, sales manager of Buffalo Pumps Inc., wholly-owned subsidiary of Buffalo Forge, said that "immediate sales prospects are excellent and the prospects for 1947 now appear to go beyond our previous expectations."

WAA Names 118 Additional Sellers of Surplus Tools

Washington—Appointment of 118 additional approved dealers during the period from June 1 to June 28 brings

the total of licensed machine tool sales representatives for the government to 2512, War Assets Administration announces. This sales program, set in motion early in January, is designed to expedite sales of government-owned machine tools and other production equipment. The 33 WAA offices as of June 28 had 311 additional applications under review.

Cumulative sales of machine tools and some production equipment sold by approved dealers through June 15 totaled $77,012,003 in cost to the government, with a return to the government of $36,349,439. Dealer sales for the period June 1-15 showed a drop of 42 per cent as compared to the previous 15-day period, attributed to the announcement that commissions would not be paid a matter later corrected by resumption of commissions.

CONSTRUCTION AND ENTERPRISE

ARKANSAS

EL DORADO, ARK.—Root Petroleum Co., Commercial National Bank Bldg., Shreveport, La., plans conversion of former catalytic cracking plant into premium gasoline manufacturing plant, at estimated cost of $300,000.

DELAWARE

WILMINGTON, DEL.—Delaware Floor Products Inc., Christiania Ave., plans to let contracts soon for a boiler house and manufacturing building, to cost about $500,000.

FLORIDA

JACKSONVILLE, FLA.—Midstates Steel & Wire Co., Crawfordsville, Ind., has had plans drawn for a plant to manufacture galvanized wire, nails and other steel products, to cost about $100,000.

ILLINOIS

ALTON, ILL.—Owens Illinois Glass Co., Alton, is having plans drawn for a plant, including machine parts manufacturing department, mold shop and engineer's shop, to cost over $100,000.

AURORA, ILL.—Barber Greene Co., 631 West Park Ave., has let contract to Campbell-Lowrie-Lautermilk Co., 400 West Madison St., Chicago, for a one-story 80 x 625 and 82 x 260-foot addition.

KINMUNDY, ILL.—City, City Hall, plans a sewage treatment plant and waterworks to cost about $130,000. E. A. Fulton, 3 South Mermec St., St. Louis, is consulting engineer.

LOUISVILLE, ILL.—J. Tant, mayor, plans sewage treatment plant to cost over $100,000. Russell & Axon, 6635 Delmar Blvd., University City, St. Louis, are consulting engineers.

INDIANA

WABASH, IND.—Eagle Picher Lead Co. plans a plant addition here, to cost over $400,000.

IOWA

COON RAPIDS, IOWA—Trustes of municipal light and power plant will receive bids July 24 for extensions and improvements, including diesel engine, cooling tower, switchboard, wiring, etc., to cost about $130,000.

DAVENPORT, IOWA—Swan Engineering & Machine Co., Harry D. Bloch, president, 105 Brady St., Chicago, has let contract to Priester Construction Co., Davenport, for a one-story 60 x 200-foot plant building, to cost over $100,000, with equipment.

LOUISIANA

MARRERO, LA.—Johns-Manville, 22 East 40th St., New York, has engaged George P. Rice, New Orleans and Nashville, Tenn., to prepare plans for plant expansion, including 120,000-square foot building for manufacture of transite pipe.

MASSACHUSETTS

WARWICK, MASS.—Johnson Automatic Mfg. Co., Second Ave., Cranston, R. I., has let contract to Gilbane Building Co. Inc., 90 Caverly St., Providence, R. I., for a plant building to cost about $500,000.

MINNESOTA

MINNEAPOLIS—Toro Mfg. Co., 3042 Snelling Ave., has let contract to A. Johnson Construction Co., 608 Foshay Tower, for a two-story machine shop addition to cost about $120,000. Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, are engineers.

MISSOURI

JOPLIN, MO.—City, J. J. Saunders, commissioner, will hold election on issuance of $700,000 bonds for a sewage disposal plant. H. T. Lawrence, 1802 NW 21st St., Oklahoma City, Okla., is engineer.

ST. LOUIS—Century Foundry, 3727 Market St., has let contract to Gamble Construction Co., 620 Chestnut St., for a one and two-story plant addition 245 x 250 feet, to cost about $170,000, with equipment.

ST. LOUIS—Lewis-Howe Co., 319 South Fourth St., is erecting a four-story 69 x 90-foot plant addition, to cost over $150,000. Widmer Engineering Co., 122 North Seventh St., is engineer.

NEBRASKA

NORTH PLATTE, NEB.—City plans sewage disposal plant to cost about $350,000. Burns & McDonnell, 107 West Linwood Blvd., Kansas City, Mo., are consulting engineers.

OHIO

CLEVELAND—Perfection Stove Co., 7609 Platt Ave., has bought a five-acre site on Mandalay Ave. to provide for future plant expansion.

CLEVELAND—West Side Machine Tool & Die Corp. has been incorporated by Elmer H. Sawitzke and associates and is located temporarily at 3241 West 50th St.

CLEVELAND—Rovex Foundry & Machine Co. has been incorporated and is setting up operations at 2313 Elm St. in a plant with 8000 square feet floor space, for finishing of castings. Pierce T. Robson is president.

CLEVELAND—New Process Bronze Foundry Co., 1276 East 55th St., has been incorporated by Charles Kapovitch. Present plant is to be expanded for production of bronze bearings.

LORAIN, O.—Air Reduction Co., New York, will build an oxygen production plant costing about $75,000 at Clinton Ave., and 28th St.

MANSFIELD, O.—Ohio Brass Co., 380 North Main St., plans erection of a plant addition to cost about $46,000.

MANSFIELD, O.—Westinghouse Electric Corp. will remodel its "C" building on East Fifth St. at cost of $50,000, for punch press work, as part of a $6,500,000 expansion project here.

PAINESVILLE, O.—Glenn L. Martin Co., Baltimore, has let contract to Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh, for design and construction of plastics manufacturing plant, to cost about $200,000.

WILLOUGHBY, O.—Willoughby Machine & Tool Co., H. Rogant and Ted Coyne, 15 Second St., are building a new plant at Church and Elm Sts., to provide additional manufacturing space, at cost of about $100,000. Present plant will be vacated.

OREGON

PORTLAND, OREG.—Pennsylvania Salt Co. has started construction of a chemical plant addition to present facilities, to cost about $1 million.

PENNSYLVANIA

CONNELLSVILLE, PA.—City plans a sewage disposal plant to cost about $450,000. Morris Knowles, Park Bldg., Pittsburgh, is engineer.

CORRY, PA.—Ajax Iron Co., Corry, has let contract to Henry Shink Co., Erie, Pa., for foundry, assembly, testing and shipping buildings, to cost $250,000. Meyers & Johnson, Erie, Pa., are architects.

ELWOOD CITY, PA.—Mathews Conveyer Co. has let contract to Uhl Construction Co., 6001 Butler St., Pittsburgh, for a plant addition costing about $55,000.

MUNCY, PA.—Jones & Laughlin Steel Corp., Ross Ave. and Third St., Pittsburgh, has plans in preparation for a plant addition to cost about $250,000.

PHILADELPHIA—Dill & Collins Division of Mead Corp., Tioga and Richmond Sts., plans a paper manufacturing plant to cost $5 million. G. F. Hardy, 441 Lexington Ave., New York, is consulting engineer.

SPRING GROVE, PA.—P. H. Glatfelter Co. plans power plant expansion to cost $600,000. H. M. Wilson Co., Brandywine and Eighteenth Sts., Philadelphia, is consulting engineer.

SOUTH CAROLINA

ROCK HILL, S. C.—Celanese Corp. of America, 180 Madison Ave., New York, plans large plant here for manufacture of cellulose acetate and celanese yarns, to cost about $10 million.

TEXAS

HOUSTON, TEX.—Shell Oil Co., Shell Bldg., has plans under way for a boiler and power plant at Deere Park, to cost about $2,500,000.

HOUSTON, TEX.—Harris county, care flood control and fresh water district No. 17, Courthouse, has plans under way for a sewage disposal plant to cost about $400,000. Howe & Wise, 610 Stewart Bldg., are engineers.

WEST DALLAS, TEX.—Ruberoid Co., 500 Fifth Ave., New York, has bought 37-acre site on which to build an asphalt and asbestos plant to cost about $1 million.

WASHINGTON

OLYMPIA, WASH.—North End Machine Works has let contract for construction of an assembly plant, company planning to convert from war work to manufacture of logging and lumber mill machinery, hoists and winches.

OLYMPIA, WASH.—Washington state has called bids July 11 for proposed $70,000 filtration system for Sedro-Wooley hospital.

SEATTLE—Seidelhuber Iron & Bronze Works, 1421 Dearborn St., is having plans prepared by Freyn Engineering Co., 58 East Washington St., Chicago and Engineering Associates, Polson Bldg., Seattle, for a mill building, office and warehouse in Seattle, 200 x 1200 feet. Will include five 25-ton cranes and five oil-fired furnaces. Cost is estimated at $1 million.

SEATTLE—Leckenby Structural Steel Co. has completed plans for a proposed steel fabricating plant 50 x 100 feet, at 2645 Eleventh Ave SW., to cost about $19,000.

SEATTLE—Isaacson Iron Works has bought plant of Sundstrand Machine Co., Rockford, Ill., from War Assets Administration, planning to manufacture tractor equipment.